

A C C S

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ROAD
PASSENGER
AFFAIRSSee Pages 2, 3, 7, 11,
15, 19, 21

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LONDON, MAY 14, 1960

PRICE ONE SHILLING

P.T.A. in Scarborough

NEXT week the Public Transport Association will hold its annual congress under the chairmanship of Mr. A. F. R. Carling. The venue will be Scarborough and two papers will be read—one by Mr. R. A. Lovell, chief mechanical engineer of the Ministry of Transport, entitled "The Ministry of Transport and the Public Service Vehicle," and the other by Mr. H. Bottomley, general manager, Ribble Motor Services, Limited, on operational efficiency in road passenger transport. The discussions and exchanges of view at these meetings (both in public and private) are always of value and assume special importance at a time when the industry is faced by another wage increase coupled with a shorter working week. Scarborough had a small tramway system from 1904 onwards; in 1931 it was taken over by the corporation for substitution by buses of United Automobile Services, Limited, which company also had taken in the Scarborough and District fleet of Robinson's Motors, Limited, in 1926—an old-established jobmaster's business which had been motorised in 1908. Today United Automobile Services serves the town, with through routes from the East Riding by East Yorkshire Motor Services, Limited. The railway route from York afforded an early example of the closing of intermediate stations in favour of the U.A.S. bus services. Another feature of interest is the use of stop boards at the tops of the numerous steep hills in the area to remind bus drivers to change into low gear.

Rationalisation in Scotland

SOON there will come into operation a railway rationalisation scheme for the area north of Inverness with a view to saving some £41,000 a year. Prepared many months ago, this scheme was submitted to the Transport Users' Consultative Committee for Scotland on May 9, 1959, and was approved by them in principle in July. Nevertheless, it exemplifies the many obstacles to be overcome in schemes of this nature that it is only now possible to contemplate bringing it into force. The main line concerned, Inverness to Wick, is 161½ miles in length; there is a 6½-mile branch to Thurso. On these sections passenger facilities will be withdrawn from a score of stations, many of which have averaged as little as one booking daily; the maximum total of outward and inward traffic (apart from a special facility for scholars who made their other journey by road) averages 38. Additionally the Dornoch branch (7½ miles) is to be closed to all traffic together with the 14-mile Fortrose freight branch. A number of stations will have sundry freight, parcels, and full wagon load facilities withdrawn. Uneconomic local trains between Inverness and Tain will cease operation and will thus assist in the acceleration of the main service. To Dingwall Highland Omnibuses already provides a 30-minute service; to Tain it is hourly and to Helmsdale every two hours; additional services are proposed to cover the facilities otherwise lost and have been carefully tailored to suit the needs of local people. At all but the most remote points B.R. cartage services will still be available for freight. Close liaison has been promised between the Northern traffic manager of the Scottish Region and the manager of Highland Omnibuses and certain buses will make main-line train connections on platform 6 at Inverness. With certain other alterations on the Skye line the railway will save £59,000 a year. In addition, from June 13 next, the public will get a better service.

Another Fine Thornycroft

IN its latest range of heavy-duty goods vehicles, Transport Equipment (Thornycroft), Limited, has set a standard of installing adequate engine power and gear-ratio spread to provide exceptionally high performance, which not only ensures economical operation on motorways free of the fear of the premature onset of engine wear, but also does not contribute to that

growing nuisance on our roads—the under-powered overloaded goods vehicle crawling up every major (and often lesser) main-road gradient and provoking potentially dangerous action on the part of frustrated drivers in the long queues thus initiated. To the existing Thornycroft range, which includes two-, three- and four-axle chassis, was added this week a high-powered two-axle articulated tractor, designated Mastiff ML QR6, designed for operation at a gross weight of 20 tons. Allied with a suitable semi-trailer, the new vehicle is in fact an

An Important Stage Attained

REVIEWING the progress of its railway modernisation scheme since its inception in 1955, the British Transport Commission has pointed out with reason, that an important stage has been reached with the virtual completion of the major planning and the increasingly visible results thereof. Earlier this year, for example, the percentage of coaching train-miles worked by diesel and electric power surpassed that worked by steam and by 1961 the total number of steam locomotives in service will be

1960 there was an increase compared with last year of 4,800,000 tons of freight carried. So far nearly a third of the wagons available have been fitted with continuous brakes; fitting of merchandise wagons should be finished by the end of the year. It follows there has been a steady rise in the number of express freight trains operated daily. Freight traffic is by no means the only beneficiary as improved passenger services have also reaped their reward. Few have perhaps attained the level of the Eastern Region electrified lines to Southend and Chelmsford where, in 1959, traffic was 126 per cent above and receipts 146 per cent above the figures for the last year of steam working, but almost all of the lines modernised by diesel or electric traction have shown really good results. Behind these tangible achievements there has been the support of the engineers and, with the future particularly in mind, that of the research organisation. Obviously the latter has much work still to do, but it can already point to many projects which have been so developed that they are now the subject of practical tests.

Revivification

TYPICAL of progress in revitalising older forms of transport in this country are two items shown this week—the new diesel locomotive maintenance depot on the Eastern Region's Great Northern Line at Finsbury Park and the conference or party boat *Fair Lady* introduced by British Waterways in the London area. The former is the first in Britain to be built specially for the purpose, although there is a number of railcar sheds, and it is intended to handle 152 diesel locomotives and 31 shunters. For the moment it undertakes daily servicing, but eventually it will deal solely with periodical examinations and repairs. General servicing, including refuelling and provision of sand and water, will be undertaken at Kings Cross, Hornsey and Hitchin depots, where most of the locomotives take up their trains. The new shed, built on the site of the former Clarence Yard goods depot, has cost £300,000. An illustrated description will appear in an early issue. The British Waterways cruiser was formerly the Leeds and Liverpool *Ribble*; 61 ft. long with a 14 ft. 3 in. beam, it is suitable for use from London up the Grand Union Canal to Berkhamsted or up the Lee Navigation to Hertford. There is room for a 20-place conference table or a luncheon or dinner for 20 (refrigerator and calor stove are provided) or a cocktail party for 40. It is an attractive facility for which bookings are deservedly already being received.

The Family Business

THE third quinquennial luncheon given by the Crow Carrying Co., Limited, to its friends—many of them customers—was a particularly significant occasion in that it marked also the 40th anniversary of the establishment of the business. It could not be expected of a Crow function that there would be any air of strict formality and, indeed, there was none. Mr. Herbert H. Crow, the chairman and managing director, looking back to the early days when his father, Mr. Latimer Crow, founded the business, recalled that the fleet had comprised three vehicles—now it numbered 185, and there had been a thousand-fold increase in turnover. If there had been changes in those respects, there were others in which he was glad to say there had been none. Some of their customers of 1920 were still with them. Mr. G. P. Blackham, of the Esso Petroleum Co., Limited, who, with Mr. F. A. Jackman, of Carless, Capel and Leonard, Limited, replied to the toast of "The Guests," could be taken as successor to the Gas Lighting Improvement Company, an original customer, and he emphasised how impressed he was by the courtesy and ability of the Crow drivers. As a customer he certainly had no cause to complain. His fellow-responder, coming from another company with a long family tradition, felt that, even if there were fewer concerns of that type about nowadays, they filled a very valuable place in the world of commerce.

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articulated version of the Mastiff Super Freighter rigid six-wheeler, introduced last November, with which it shares many common components. Chief of these are the Thornycroft QR6 direct-injection diesel engine, which with a capacity of 600 cu. in. (9.83 litres) has a net maximum output of 130 b.h.p. and 435 lb./ft. torque, and six-speed (overdrive top) constant-mesh gearbox—a well-proved combination providing a performance outstanding in British vehicles in this class. Equally favourable were fuel economy and brake performance recorded in a recent MODERN TRANSPORT road test, a report of which will appear in an early issue, while ease of control and the attention paid to driver wellbeing were fully up to the very high standard for which other Thornycroft vehicles are noted.

Roadcraft Campaign

PHASE VI of the London Accident Prevention Council's current drive for greater safety on the road, the Roadcraft Campaign, is being operated by the Metropolitan Police, in conjunction with the Road Safety Committees of Ilford and East Ham, during this week and until May 25. The campaign is concentrated on a three-mile stretch of the important and busy A118 road from Romford Road in East Ham (at the junction with Green Street) to Seven Kings Station in Ilford, where during the first three months of this year no fewer than 43 accidents involving personal injuries occurred. All available police are concentrated on this stretch of road during the period, giving advice to drivers, riders and pedestrians on good roadcraft. Special attention is being given to busy intersections and shopping centres. The two road safety committees are giving the scheme full support by displaying and distributing propaganda designed to make everyone in their districts aware of the campaign, and inviting their personal co-operation in being more skilful, careful and courteous.

about 7,800, or about 40 per cent fewer than in 1954. There will be almost no steam traction in East Anglia or in South-East England and relatively few locomotives will be left west of Newton Abbot on the Western Region, on the East Coast main line from Kings Cross or on the main line north from St. Pancras as far as Bedford. This autumn should see completion of nearly 200 route miles of 25,000-volt electrification schemes including the Glasgow suburban area, Manchester—Crewe, and the lines from Liverpool Street to Chingford, Enfield, Hertford East, and Bishops Cleeve, together with the conversion of the Chelmsford and Southend Victoria d.c. system. A further 280 route-miles due for electrification in 1961 include the London, Tilbury and Southend line, Liverpool—Crewe and the second stage of the Kent Coast scheme. Introduction of new multiple-unit diesel stock should be almost complete by the end of this year and a further development will be the introduction in July of the de-luxe Pullman diesel sets working on the London Midland Region between Manchester and St. Pancras and Leicester and St. Pancras and on the Western Region between Bristol and Paddington and Wolverhampton, Birmingham and Paddington. The two six-car sets for the L.M.R. will have first class accommodation only and the three eight-car sets for the Western Region will have both first and second class.

Reaping Some Benefits

IF the advent of new multiple-unit sets is nearing its end, the flow of main-line diesel locomotives is increasing. There are more than 500 already at work and these should be nearly doubled at 900 by the end of the year and have risen to 1,200 by mid-1961. All this must, of course, be satisfactory to those who have laboured so valiantly in the cause of modernisation, but it becomes really worthwhile when regard is had to actual results in the shape of increased traffic. In the first 15 weeks of

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The Editor is prepared to consider contributions offered for publication in MODERN TRANSPORT, but intending contributors should first study the length and style of articles appearing in the paper and satisfy themselves that the topic with which they propose to deal is relevant to editorial requirements. In controversial subjects relating to all aspects of transport and traffic this newspaper offers a platform for independent comment and debate.

We desire to call the attention of our readers to the fact that Russell Court, 3-16 Woburn Place, London, W.C.1, is our sole London address, and that no connection exists between this newspaper and any other publications bearing somewhat similar titles.

Cross-Subsidisation

BUSINESS men sometimes find the arguments of economists difficult to follow for more than one reason. They are couched, perhaps necessarily, in the jargon of a specialised subject and they often assume an appearance of oneupmanship rather than realism. In transport, operators have shown themselves well aware of the enervating influence of subsidy and have set themselves out to avoid it at all costs, but they will probably feel less sympathy with arguments recently launched in two quarters against the principles of cross-subsidisation—or, in plain language, the well-accepted usage of taking the rough with the smooth, especially where only one undertaking is involved. The area agreement system, on which our bus network has been evolved, may be taken as an example, since it has been specifically criticised. Inside a company's territory it takes responsibility for provision of a number of services on which average receipts fall below the level of average costs, sustaining them out of the surpluses on the better-paying routes. There seems no harm and, indeed, a lot of good to be derived from this procedure, which over nearly half a century has produced in Britain the densest network of public bus facilities to be found anywhere in the world. Fat routes have carried the thin; the social advantages of the partial monopoly have been that remote rural areas have had the benefits of links with the towns and their activities; indeed the policy has also enabled thinly trafficked urban areas to get facilities otherwise unobtainable.

Unremunerative Bus Routes

BUS companies support these unremunerative sections of their business for a variety of cogent reasons. They may always hope to develop more business on them either by inculcating a desire for travel or through some development which brings more traffic into a particular channel. Some are retained probably for prestige or even sentimental reasons. A sense of nothing less than social obligation has kept many in being. Other marginal routes can be justified on quite reasonable business grounds because even if not strictly profitable on an annual basis they are so for certain periods and in any event they make a useful contribution to the overheads of the business as a whole and feed traffic into other parts of the network which it would not otherwise receive because if the outer section of the bus route were missing private transport would be invoked. We believe that at least one of the critics of the principle was imbued by the feeling that if cross-subsidisation were ended there would be more opportunity for the small operator. There are areas where small operators

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flourish but few have gone to the wall in the past; indeed, the existence of a large operator has often enabled the small man to dispose of a somewhat burdensome business at a substantial figure. The traffic commissioners and, indeed, the licensing system, recognise the virtues of a situation which has been of benefit to the public at large; the commissioners have been at hand to detect potential abuses.

The London Examples

PARLIAMENT, in fact, has recognised the benefits; through the London Electric Railway Companies' Facilities Act of 1915 the London Underground group obtained powers to establish a Common Fund under which the financial interests of the railways of the group and of the London General Omnibus Co., Limited, were brought together in a pooling scheme, which was modified in 1921 and again in 1928. Each company took its own fares, paid its working expenses and fixed charges, allocated a suitable sum to depreciation and reserve and passed the remainder to the pool, which was at first divided so that the L.G.O.C. had 40 per cent of the fund and finally so that it took 24.4 per cent. There was also a pool between the L.G.O.C. and the bus companies with which it had working agreements. Under the 1933 London Passenger Transport Act a pooling arrangement between the L.P.T.B. and the main-line railways for suburban traffic was set up to aid the implementation of plans for new tube railways. Mr. D. L. Munby, Reader in Economics and the Organisation of Transport at Oxford University, in his lecture on the future of inland transport to the Royal Society of Arts last week, suggested that restrictive monopolistic licensing in road haulage and road passenger transport was quite out of tune with the anti-monopoly legislation of the postwar world of full employment, that control of vehicles, hours of work and schedules might be needful, but that a licensing system which secured those benefits need not be so restrictive as the present one, "which is necessary only if we accept a large measure of cross-subsidisation as essential, or if we believe in the desirability of monopoly privileges for road operators."

Public versus Private Transport

WE have heard the virtues of the complete abolition of present forms of monopoly licensing declaimed before, but some of us are old enough to remember pre-licensing chaos—piracy, road racing, creaming, bankruptcy. We are all for that private enterprise which turns sand into gold, as the second generation of busmen and hauliers, if not the pioneers, did, but it is difficult to ignore the virtues of monopoly, if wisely controlled, as a means of providing public service in that elusive business where seat-miles and ton-miles generated at a given moment are lost for all time if they are unused. It is quite different from the provision of a tangible commodity which can be sold at some other time if not purchased at the instant it is put in the shop. Elsewhere in Mr. Munby's remarks certain virtues of public transport over the car were made clear; if public transport, passenger or freight, is to survive, we feel sure the various forms of it should be co-operating rather than competing. Rather than abolish cross-subsidisation, this might be the time to examine whether, without in the least disturbing present ownership, there might be instituted some forms of pooling rather on the lines of the London Common Fund of 1915 for the purpose of presenting a bus, rail and air network of maximum value to the passenger, with similar facilities for the freight shipper. Such a scheme could be highly commercial and yet might only be workable if some machinery for providing cross-subsidisation, say between a bus service and a rival diesel railcar service, or between an abandoned railway and a country lorry service, existed. As in the classic example, the gain on the swings may only be possible if the customers are attracted to the fair by the costly and unprofitable roundabouts.

MODERN TRANSPORT has an arrangement with Reuter's Trade Service whereby publication is made in this newspaper of all essential news from all parts of the world concerning traffic and transport by rail, road, sea and air and allied interests.

NEWS SUMMARY

THE National Council for the Omnibus Industry announced agreement on revised wages and hours of work on May 9. This was the remaining section of the industry for which a settlement had not been reached (page 4).

It is expected that the de-luxe Pullman diesel sets will come into service in July between Bristol and Wolverhampton, Birmingham and London, and Manchester and Leicester and London.

The Federation of Civil Engineering Contractors has stated that there is sufficient spare capacity in the industry to support twice the present rate of road construction.

On May 10, Mrs. Diefenbaker, wife of the Canadian Prime Minister, launched the

Canadian Pacific 27,300-ton liner *Empress of Canada* at Vickers-Armstrongs Walker on Tyne yard.

At the College of Aeronautical and Automobile Engineering Mr. Brian Rootes, giving the Wakefield Memorial Lecture, said the motor industry was hampered through road development failing to keep pace with the increasing number of vehicles. There was no real master-plan; the short-term annual basis was uneconomic.

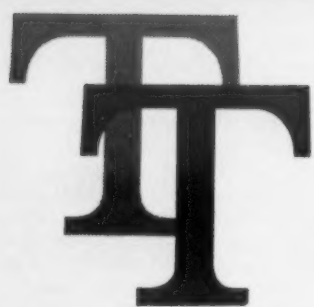
The proportion of overseas visitors to the Mechanical Handling Exhibition at Earls Court this year is thought to be higher than on any previous occasion. From two to three hundred have been received every day and delegations came from Russia, East Germany, and Japan. The general attendance was reported on Wednesday this week to be up on 1958. The exhibition closed on May 13.

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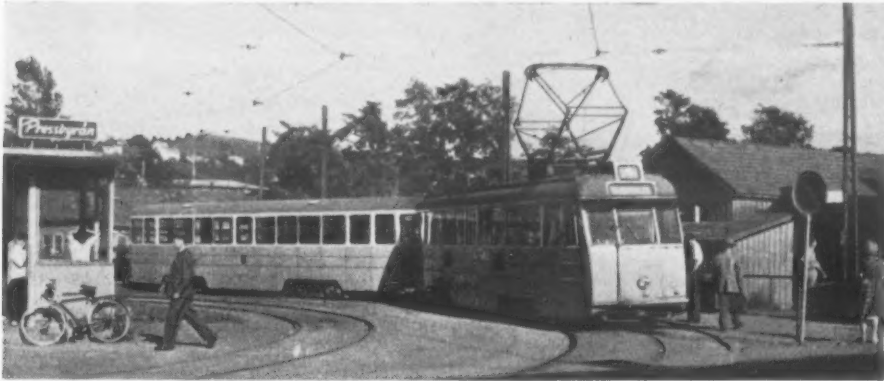
EXPERIENCE IN GÖTEBORG

AT midday last Saturday we travelled on a bus from Cardiff to Newport which had lost 12 min. on a 40-min. running time before we were compelled to leave it and walk past a traffic block to keep an appointment. There are few towns where irregularity of bus running caused by the upsurge of private car traffic can be avoided. Losses of mileage can be mitigated, however, by various regulatory methods; the special attention given to the Central London area by London Transport has already been detailed in our columns, together with the electronic scanning system, giving a picture of the state of an entire route, so far available only on Service 74, from Camden Town across the West End to Putney Heath.

to the centre take place on this channel. As it is of importance that the A-channel is free if any urgent call should come, all talks thereafter are switched over to Channel 1 or Channel 2. The system with a general call channel has been chosen in order to obtain the greatest scope in calling one or several vehicles in different combinations from the centre. It may be necessary, for instance, to give an order to some particular vehicle or to all vehicles on a certain route, or perhaps to all vehicles on the way to a certain point in the town. As the conversation is switched over to another channel, the drivers thereafter are not disturbed by talks which are not directed to them.

Supervising Vehicles

The radio sets of the supervising vehicles can be switched to receiving or transmitting on all the



Southern terminus of tram service 4 in Göteborg, showing motor car and trailer on loop

Results have, however, been so satisfactory that the method is to be extended to other services. Gaps have been closed between buses and lost mileage has been reduced, despite unfavourable street conditions. In Paris what might be called an automatic starting system, which does not regulate a service immediately, has been adopted at certain termini. Closed-circuit television has its uses for supervision and we have described its aids in queue control in Johannesburg.

Two-Way Radio

Hitherto, however, for various reasons the bus operator has been somewhat shy of adopting two-way radio control for regulation of city services, although this has proved such a boon in taxi and lorry operation. Certain undertakings keep in touch with inspectors' cars by radio but comparatively few have gone the whole hog and equipped a fleet of vehicles with receiving and transmitting sets. The Göteborgs Spårvägar in Sweden is one which has done so and its general manager, Mr. S. Camp, is to present a report on the subject of radio and television aids at the Copenhagen Conference of the International Union of Public Transport, May 11 to 17, 1961.

In Göteborg, a city of 400,000 population, there

are five channels. Traffic supervisors and other foremen are in this way enabled to follow what is happening and to hear the reports directly and they can therefore take the necessary steps as quickly as possible. In this way the situation can be kept under continuous control. The central radio office is equipped with two operating desks, and furthermore there is the possibility of recording calls on a dictation machine, which starts automatically when a call is coming. It is also possible to connect the radio with the loudspeaker telephone system of the head office. Channels 3 and 4 can also be connected with the national telephone network. Further, the central station is able to pass on talks between the cars should they be in such a geographical position that they cannot hear one another direct. Some supervisory cars have been equipped with a simple selector device, and by the aid of this the operator at the radio centre can sound the horn of the car. In this manner the driver can be called to the car in order to answer.

Organisation

Traffic control organisation is at present carried out on these lines. At the top there is the central radio office or traffic control office, which during the off-peak is manned by one operator and during peak hours, or while special events are in progress, by two persons. This office can communicate with all vehicles in the town by radio and with all important stopping points and termini by loud-



Controller's office, showing message being sent and, right, a driver speaking into his cab-mounted microphone



were, at the last return, 173 trams (with 140 trailers), 182 buses and 19 trolleybuses, and in 1957 it was decided to equip all vehicles (except some older ones, due to be scrapped) with units for two-way radio communication. All vehicles—passenger as well as repair and supervising vehicles—are therefore able to communicate with the central traffic control office. This involved provision of 350 stations. Before the radio installation was bought, very careful investigations were made in order to ascertain what the gain would be. It turned out that the saving in time of reports and orders was very great, which is of special importance for the tramway system, otherwise an accident can quickly cause congestion. It was also calculated that the radio installation would pay for itself in a short time, as a number of road inspectors could be withdrawn.

Channels

Five radio channels are used in the 160 mc band and are designated A, 1, 2, 3 and 4. All passenger vehicles have transmitters and receivers for A, 1 and 2. Channel 3 is used for communication with and between inspectors and the central control office. No. 4 is used for repair vehicles and relief service. The simplex system is used, i.e. transmitting and receiving must take place alternately. This requires discipline in talking and experience shows that this system is the best one for reporting and giving orders. It makes the talk short and concise.

All vehicles in operation have their receivers switched to Channel A. All calls from the central station to the vehicles as well as from the vehicles

speaking telephones. Further, there is telephone connection with the police, ambulance, fire-brigade and other public services. In the city three radio cars patrol, each having a district. Then there are three inspectors on foot at three especially critical traffic points. When the new organisation was introduced, 15 pedestrian inspectors were withdrawn. Through the saving caused by this, the whole radio installation will be paid for in three to four years.

Drivers are obliged to report delays of five minutes or more, and all events which eventually could have influence on traffic. The radio and the organisation was taken into service successively during 1958. The results are felt to be very good. An accident which earlier would have caused a stop of 15 to 30 minutes is now, as a rule, cleared up in less than five minutes. The vehicles are now much more quickly re-timed again after a disturbance causing delay. The fact that the traffic control office can know the position of each vehicle on the route, and furthermore can ask for the number of passengers in each vehicle, makes it possible to re-schedule vehicles with the smallest possible disturbance for those travelling. If an accident occurs, the police and the ambulance can be called very quickly. Accidents and irregularities in traffic which have no direct connection with the tramway and bus traffic are reported very rapidly by radio.

The trams and motor buses of the transport undertaking operate practically all over the city, and should any accident or congestion be observed anywhere, it is reported, enabling the police to

(Continued on page 15)

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Granted

TEN vehicles were authorised by the East Midlands Area Licensing Authority to be added to the fleet of Boston Stevedores, Limited (trading as the Tower Hill Transport Company), in Nottingham on Monday this week as a maintenance reserve to replace vehicles withdrawn for overhaul or repair. The Tower Hill Transport fleet numbers 139 based at about a dozen places. The interest in this decision is that it is the first on such a scale concerning an operator who originally acquired special A-licence vehicles. In 1957 the Transport Tribunal ruled in the Harold Wood appeal that the repeated use of regulation 15 of the Goods Vehicles (Licences and Prohibitions) Regulations, 1952, was not appropriate for large operators because of the waste of time and effort. This case, however, concerned ordinary A-licences and contract A-licences.

In the Wood appeal the Tribunal said that the ratio of maintenance relief vehicles to the operational fleet must in every case depend upon the circumstances. Many licensing authorities, it was told, adopted as a rough guide one maintenance vehicle to every ten in the fleet, but the Tribunal itself has sanctioned ratios varying from 4 to 7½ per cent. In the Boston case this week the B.T.C. counsel, Mr. A. W. Balne (doubtless with an eye on the needs of B.R.S.) said that it regarded the exploitation of temporary substitution under regulation 15 as wrong. Boston Stevedores submitted in support of its application that as a deliberate policy it had not hitherto replaced many of the vehicles it had acquired from B.R.S., fearing renationalisation, and it had a large number of repairs to carry out.

Dublin Sees the Atlantean

CORAS Iompair Eireann has on trial for two months a rear-engined Leyland Atlantean double-deck bus with seats for 78 passengers.

Road Haulage Wages Order

PAYMENTS for holiday periods and night work are revised in the new road haulage wages order RH(68) which came into operation on May 13. The new order comprises all statutory wages provisions and therefore replaces RH(66).

Seafront Building Objected To

PLANS by Southdown Motor Services, Limited, for new offices and a restaurant adjoining its depot on Worthing seafront have been turned down by the Corporation Town Planning Committee because they would be contrary to a long-standing policy to remove the coach station from the seafront.

G.P.O. Settles for Diesels

FOLLOWING a two-year trial period, the General Post Office has decided to change from petrol to diesel for all its heavier vans in future. The trials commenced in 1958 in London and many

provincial towns with 50 vans. Substantial fuel economies over existing petrol-engined vans were obtained, and the trials were further extended to heavier vans which were supplied to garages throughout the country. Last year the G.P.O. motor transport bill came to just under £4½ million.

Delivery Service Efficiency Day

TRANSPORT, dispatch and personnel managers are being invited to participate in a special one-day course organised by the Industrial Welfare Society at Robert Hyde House, 48 Bryanston Square, London, W.1, on May 24 from 10 a.m. to 5 p.m. The theme is the importance of vanmen and delivery salesmen and how their efficiency can

warehouses, has had a remarkable success, it is stated. The new company will take over D.M.S. as a wholly-owned subsidiary in order to protect the name and to retain the goodwill built up over the years. The framework and operations of the old and new companies will be precisely the same. Only the name will be changed. It was in 1923 that a group of Yorkshire road transport contractors gathered together in an office in Sheffield to hammer out a plan to do away with cut-throat competition and the spectacle of under-employed fleets. The directors of Sheffield Haulage and Storage are Messrs. W. Bingley, J. Senior, E. J. Shaw, L. Matthews, H. Booth, W. Truswell and T. Smith.

D.M.S. never owned any transport of its own and neither will the new company so there never has been nor ever will be any temptation to give itself the profitable contracts and leave the less profitable ones for others to handle. "Good" work and "bad" work has been and will continue to be passed out to the 123 shareholders in equal proportions. Each member holds only one share in the company to ensure that everyone has an equal say in its running. The two new warehouses



Loading of Eurofreight Truksea Continental smalls traffic at London depot of Atlas Express: 1-ton collapsible container is positioned on platform for loading and (right) two such containers ready to leave for the London wharf. This development was referred to in our last issue

greatly influence company prosperity. Mr. R. F. Block, managing director, Blox Services, Limited, Morden, will discuss working conditions and their improvement. He will be followed by Mr. E. W. Bowling, education and welfare officer, United Dairies, Limited, who will examine the methods that can be used by a driver to improve his appearance, attitude, driving, salesmanship, etc., and after lunch Mr. F. C. Tindall, site personnel manager, T. Wall and Sons, Limited, will show how a company can develop a team spirit. Incentives, security, recognition, communications, consultation, road and depot amenities, hours of work, employee benefits will all be dealt with. The course will end with an open discussion.

D.M.S. Changes its Name

AFTER 37 years' trading, Direct Motor Services (Sheffield), Limited, the non-profit making haulage co-operative organisation, is to change its name. In future it will be known as Sheffield Haulage and Storage, Limited, because it is felt that the organisation should bear a name more clearly indicating the full nature of its activities. The recently opened storage side, with two large

measure 160 ft. by 60 ft. and 210 ft. by 80 ft. respectively and the gable of the roof in each case is 30 ft. from the ground. Space adjoining is available for further expansion. Extensive use is made of fork lift trucks and pallets, but general traffic of all classes is warehoused.

Commissioners Firm on Coach Rights

THEY could not give way to a proposal that public service vehicles which only set down and pick up passengers should be restricted in any way in respect of using the public highway when private cars are allowed to wait there. The proposal that because cars are large in number they should be given preference was one which spelt disaster in future, said Mr. H. J. Thom, chairman of the South-Eastern Area Traffic Commissioners, at Chichester on May 6.

The Commissioners were considering applications by three London coach companies—George Ewer and Co., Limited, Orange Luxury Coaches, Limited, and Fallowfield and Britten, Limited, to set down and pick up passengers on the Hard, Portsmouth, in connection with their day excursions from London to the Isle of Wight. Only

passengers holding day return tickets, and using the British Railways ferry to Ryde, were concerned in the application. Portsmouth City Council opposed the application.

Mr. F. J. Speight, director and general manager of the three companies, said that, until now, coaches set down in St. George's Square, Portsmouth. This had caused considerable difficulty because very often, owing to the timetable factor, the passengers had only five minutes to catch the ferry. Announcing the decision to grant a temporary condition, excluding Saturdays, Mr. Thom said this was the best thing in the circumstances, pending consideration by the City Council of the possibility of using College Street as a setting-down and picking-up point.

Liverpool Rail Vehicle Depot

BUILT at a cost of £136,000, a new road motor depot was opened by British Railways at Huskisson Dock depot, Liverpool, last week. It provides facilities for heavy repair work, body overhauls and repainting for about 800 vehicles (including 45 miscellaneous units such as cranes and tractors used for shunting) and for the maintenance of 1,385 trailers operating in the Liverpool and North Wales areas. Occupying a total area of 28,500 sq. ft., the new building is in three main sections: vehicle inspection and mechanical workshop; vehicle and trailer body repairs section; and fully enclosed vehicle and trailer paint shop.

N.C.O.I. Wage Settlement

INCREASED wage rates and a shorter working week were agreed to by the National Council for the Omnibus Industry, representing provincial bus company workers, in London on Monday. The details of the settlement are:

- Increases immediately in the basic rates of pay of 10s. 8d. per week for drivers, conductors, and semi-skilled and unskilled maintenance staffs;
- The introduction of a 42-hr. week without loss of pay, for those staffs, to become effective from the beginning of the first full pay week after August 1;
- A national rate for one-man operation, accompanied by a resolution of the council designed to facilitate an extension of this form of operation;
- An increase of about 22s. to 212s. 8d. in the basic weekly pay of skilled maintenance workers which from June would apply to a standard week of 42 hr.

It was further agreed that the present arrangements in regard to the carriage of standing passengers should continue. On the municipal side a new agreement restricting standees on large double-deckers was reached in March.

Bus and Coach Developments

W. Higson and Co., Limited, Frome, applies for excursions and tours of G. Hillman, Westbury.

Hants and Dorset Motor Services, Limited, proposes 25 special circular tickets permitting break of journey at specified points.

Bristol Omnibus Co., Limited, proposes a Cheltenham—Avening service to replace Cheltenham—Nailsworth, Stroud—Avening and Stroud—Nailsworth routes. Services in Stroud are to be re-routed to use the new bus station in Merrywalks.

Glasgow Corporation applies for a new bus service between Mossbank and University or Kelvinside. This follows largely tram route 3 save for a diversion in Pollokshields away from Maxwell Road and the extension to Kelvinside.

Mansfield District Traction Company has taken over Wain's Coaches, Limited, Mansfield.

Owing to staff shortage at its Garston garage, London Transport is reducing the service frequency on a number of routes in the Watford area. Those affected are 306, 311, 321, 346, 346A, 347 and 385. The Saturday route 322s will be withdrawn. The changes will take effect with the introduction of summer timetables on May 25.

Buckmaster Garages, Limited, Leighton Buzzard, seeks the excursions and tours from Leighton Buzzard of Seamarcs Bros., Limited.

SPEEDIEST FARE COLLECTION with BELL PUNCH

FARE COLLECTION SYSTEMS

Speed, ease, accuracy—these are the qualities everywhere associated with BELL PUNCH machines, four of which are shown here.

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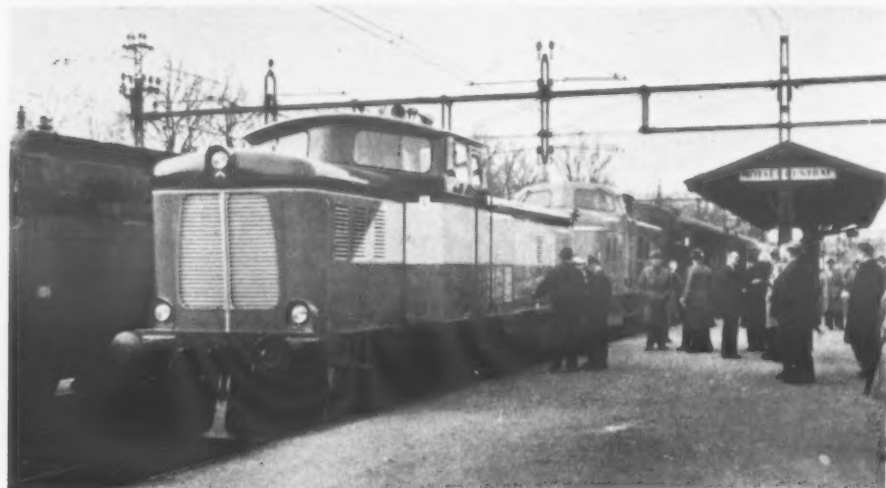
SWEDISH DIESEL-PNEUMATIC LOCOMOTIVE

Unique Development by Motala Verkstad

SECOND PROTOTYPE ENTERS REGULAR SERVICE

WIDE departure from orthodoxy in the power-transmission system is apparent in a new 1,500-h.p. diesel locomotive recently delivered by the builder, A.B. Motala Verkstad, Motala, Sweden, to Swedish State Railways on a two-year hire contract. The locomotive, to which

new engine, which has an all-driven BB wheel arrangement and is designed for 15-ton axle loads, has already successfully completed two months of initial trials (about 7,000 miles), including dynamometer car tests, with Swedish State Railways and has now entered a two-year period of service



The Motala Verkstad 1,500-h.p. diesel-pneumatic turbine locomotive about to leave Motala Central Station for Stockholm hauling a 500-ton demonstration train on April 8; the second locomotive in the train is the 1,200-h.p. prototype diesel-pneumatic engine

reference was made in our issue dated April 16, is described by the manufacturer as a diesel-pneumatic turbine locomotive; in fact the form of transmission employed is a compound pneumomechanical system that combines the advantages of the smoothness and favourable torque characteristics of the turbine and the high efficiency of mechanical drive.

Thus far the system bears similar relationship in improved overall efficiency compared with

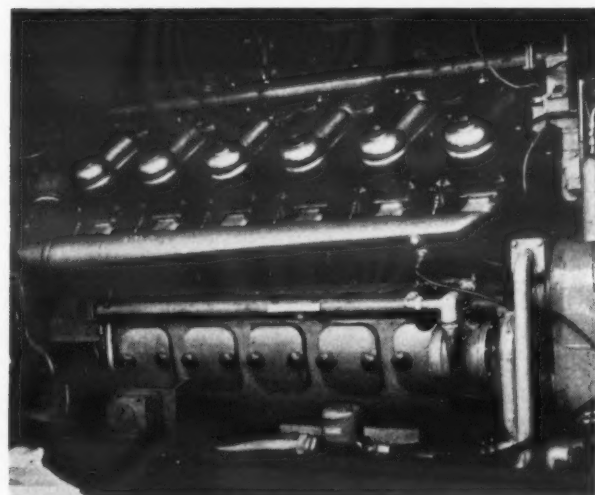
in mixed traffic with that operator, initially on a fairly difficult 100-mile section of line in Småland, between Nassjö and Kalmar.

Conventional Diesel Engine

Unlike other turbine-driven locomotives built and projected, the Motala Verkstad design embodies a perfectly conventional liquid-cooled four-stroke diesel engine. After study of various available designs, that selected was the French S.E.M.T.-Pielstick V-form engine, which is now manufactured under licence by Hedemora Verkstader, Hedemora, Sweden—a company, as is Motala Verkstad, associated with the A. Johnson and Company group, Stockholm. The basic S.E.M.T.-Pielstick engine has a long history of development, more particularly in industrial applications; in its current railway traction form it is a 90-deg. V-form indirect-injection water-cooled four-stroke of 5.64 litres per cylinder (bore 185 mm., stroke 210 mm.) developing up to 100 b.h.p. at 1,500 r.p.m., produced in sizes from 4 to 16 cylinders.

Individual Cylinder Service

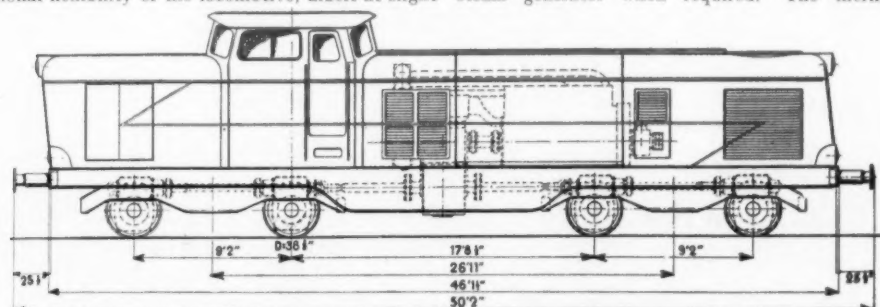
Features are a tunnel crankcase with separate connecting-rod doors and individually cast cylinders, resulting in good accessibility for servicing individual cylinders and component parts of light weight, most of which can be handled without mechanical assistance. Main and connecting-rod bearings and camshafts can, in fact, be exchanged without removing the engine from the locomotive. The engine is comparatively light in weight, a four-cylinder 400-h.p. unit weighing about 5,950 lb. and a 16-cylinder 1,600-h.p. engine weighing some 17,300 lb. In the new locomotive, two of these diesel engines are installed, on three-point Metalastik Cushyfoot mountings, a 12-cylinder 1,200-h.p. unit for propulsion and a four-cylinder unit coupled to a 160-kW. generator for train heating, though the latter can be replaced by a steam generator when required. The thermo-



Good accessibility of the diesel engine with locomotive side covers removed

static turbine drive as do the various forms of existing compound hydromechanical transmission to the unaided hydrokinetic torque converter, though the use of air rather than hydraulic fluid provides greater flexibility in installation. The Motala conception goes farther; it exploits the use of air as the operating medium to obtain a 20-per cent power boost over the normal diesel engine rating when required by burning additional fuel in the turbine intake air, so improving the operational flexibility of the locomotive, albeit at slight

removing the engine from the locomotive. The engine is comparatively light in weight, a four-cylinder 400-h.p. unit weighing about 5,950 lb. and a 16-cylinder 1,600-h.p. engine weighing some 17,300 lb. In the new locomotive, two of these diesel engines are installed, on three-point Metalastik Cushyfoot mountings, a 12-cylinder 1,200-h.p. unit for propulsion and a four-cylinder unit coupled to a 160-kW. generator for train heating, though the latter can be replaced by a steam generator when required. The thermo-



Drawing showing general arrangement of power-transmission units and giving leading dimensions

additional expense of fuel economy and exhaust smoke in the maximum power range.

Eight Years' Development

The present locomotive is one of a series for main-line service, ranging in power from 1,250 to 4,000 b.h.p., offered by A.B. Motala Verkstad, which built its first locomotive in 1861 and has been one of the main suppliers of locomotives and rolling stock to Swedish State Railways since 1862. The company started practical development work on the new system of transmission, which is based on designs originated by Dr. L. Geislinger, doctor of engineering, Salzburg, Austria, in the early 1950s and completed the first diesel-pneumatic turbine locomotive in November, 1954. This prototype engine of 1,250 total h.p. with afterburning and embodying a two-step mechanical gearbox in the compound transmission, has been in regular service in mixed traffic on the Stockholm-Nynäs line ever since, having covered some 250,000 miles in five years.

Entirely satisfactory operation of the first prototype has encouraged development of the second locomotive embodying a similar power-transmission unit, except that a three-step mechanical gear replaces the two gears of the earlier design and total horsepower has been increased to 1,500. The

statically controlled water-cooling system for both engines is interconnected, so that temperature of the train-heating engine is maintained at working level during idle periods.

Engine starting is by compressed air and to restrict the size of air starting motors required, the present locomotive employs separate air compressor and reservoir rated at 30 atm. for starting purposes, though the starter motor employed operates at about 15 atm. New low-pressure equipment of compact size is under development; when this is ready, air for engine starting will be taken from the locomotive brake reservoir, which is maintained at 8 atm. pressure.

Pneumomechanical Transmission

The arrangement of the compound pneumomechanical transmission is shown diagrammatically, with a single-speed mechanical section, in an accompanying illustration. Referring to the diagram, it will be seen that the diesel engine is mechanically connected through a step-up gear (2 and 3) to a differential. The differential crown wheel (7) is toothed both internally and externally, the peripheral teeth engaging with a pinion (8) coupled to the propeller shaft and the annular teeth engaging with the planet pinions (4). There

(Continued on page 16)

Greater speed and simplicity
in remote signal control



View of Type 'S' Control panel for remotely operating a station on a single line of railway. Front cover has been removed to show relays.

WITH THE

AEI-GRS Type S remote control system

The Type S remote control system, developed by AEI-GRS, provides a swift, simple and economical means of remote control and indication, using a minimum of apparatus. Designed specifically for remote control of a single location this 'synchronous stepping' code system is based on a unique principle employing the free swings of two mechanical oscillators—one at each end of the circuit—to create the steps of the code.

METHOD OF OPERATION

CONTROL action completed in 1 second

To control a field device, a switch on the control machine is moved to set up the appropriate code in the control office application unit. This code is transferred to the stepper unit and transmitted over the line circuit to the field apparatus. The field stepper unit on receiving the code applies it to the field application unit, which responds to the particular code message and controls the function relay operating the field device. This entire control operation takes approximately one second to complete.

INDICATION given in 2 seconds

When a field device changes position, it notifies the field application unit which automatically starts the stepper unit transmitting the appropriate code back to the control office, where an indication light on the control panel diagram shows the new position of the field device. Indication is completed in about two seconds.

SIMPLEX AND DUPLEX SYSTEMS

Type S remote control system installations of many types can be furnished to meet specific traffic requirements, from a Simplex 7-step system with a capacity of 32 control codes, to a Duplex 11-step system providing a maximum of 1,024 control codes.

Already this AEI-GRS system has proved highly successful in many installations, and over transmission distances of up to 200 miles. As in all coded systems, codes are contained in a series of steps, or intervals. However, with the Type S system the use of mechanical oscillators to create the steps ensures that codes are of uniform length and that stepping speeds are always constant irrespective of normal voltage variations. Conventional signal lines can be employed and provision made for voice or telegraphic communication over the same wires if desired.

Each installation has its own individual problems in the solution of which AEI-GRS Engineers are always ready to co-operate and make suitable suggestions.

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BOOK NOTICES

Trade and Technical

CORROSION OF HEAT-RESISTING ALLOYS IN THE PRESENCE OF FUEL-OIL ASH (London: The Council of British Manufacturers of Petroleum Equipment, 2 Princes Row, Buckingham Palace Road, S.W.1. Price 5s. net.) This book records the findings of the Corrosion I Committee of C.B.M.P.E. in the form of papers, reprinted from Petroleum Equipment News, Vol. 7, Nos. 4 and 5, by Dr. L. B. Pfeil and Mr. H. Lewis.

1959 BOOK OF THE YEAR. (London: Shell-Mex and B.P., Limited, Shell-Mex House, Strand, W.C.2.) Marking entry into the second century of the oil industry, this book tells the 1959 story of Britain's largest oil-marketing company, covers various aspects of the role of oil in three other great industries—two of which did not exist until petroleum products made their development possible—and pays tribute to men and women engaged in those industries. Special features deal with bitumen for roads, the motor car industry and the man-made fibres industry.

TRADER HANDBOOK 1960. (London: Trader Publishing Co., Limited, Dorset House, Stamford Street, S.E.1. Price 21s., postage 2s.) Invaluable alike to all connected with the motor and cycle industries at home or those abroad seeking contact with British suppliers, the 54th edition of *Trader Handbook* has been revised where necessary and brought up to date. Its comprehensive contents, which include technical and service data on all types of motor vehicles, buyers' guides to suppliers of components, accessories and service equipment, proprietary names and trade addresses, are carefully indexed and easy to find.

A.B.C. COACH AND BUS GUIDE. Summer, 1960. (London: Index Publishers, Limited, 69 Victoria Street, S.W.1. Price 5s.) The current edition of this standard timetable for travel agents and, indeed, many members of the public, has been

partially recast so far as the display of the Royal Blue Express Services are concerned and this has made possible the display in greater detail of the facilities available from London suburban centres such as Kingston. This is also the first issue to show the full effect of the opening of M1 with regular services of nine operators now using the new motorway.

ROAD VEHICLE LUBRICATION. (London: Wakefield-Dick Industrial Oils, Limited, Castrol House, Marylebone Road, N.W.1.) Although primarily a manufacturer's promotional publication, this well-known book, first published in 1949, treats its subject generally and comprehensively. This new revised edition takes note of recent developments, such as detergent, low-viscosity and multi-grade lubricants and discusses problems associated with the proper care of road-vehicle components. As well as providing a yardstick by which vehicle users may judge their own operational and maintenance procedures, it forms a valuable textbook for students and embryo road-vehicle engineers.

A.A. FOREIGN TOURING GUIDE, 1960-61. (London: The Automobile Association, Fanum House, Leicester Square, W.C.2. Price 7s. 6d. For members only.) Brought up to date year by year, the current edition of this 352-page guide notes the important changes in the motoring regulations of France, Italy and Switzerland and also gives details of the reciprocal free medical services available to British tourists in Norway, Sweden and Yugoslavia. Over 5,400 hotels—80 more than last year—92 motels and 1,167 garages in the 19 countries covered are listed, forming only part of the comprehensive information essential to British drivers in Europe.

TIN AND ITS ALLOYS. Edited by Ernest S. Hedges, M.Sc., Ph.D. (Manc.), D.Sc. (Lond.), F.R.I.C., F.I.M., director of the Tin Research Council and the Tin Research Institute. (London: Edward Arnold (Publishers), Limited, 41 Maddox Street, W.1. Price £6 6s. net, inland postage 2s.) In the preparation of this book Dr. Hedges has had the collaboration of five outstanding specialists in various aspects of tin and tin alloys, their physical and mechanical properties, chemical behaviour, practical metallurgy and applications. Throughout the work, care has been taken to avoid a mere recording of facts and wherever possible to present critical discussion.

A.A. MEMBERS HANDBOOK 1960-61. (London: The Automobile Association, Fanum House, Leicester Square, W.C.2. Free to members.) Appearing this year with a newly designed linen cover, the new A.A. annual handbook has also a number of less obvious innovations, including open hours of the appointed garages operating the free breakdown scheme, motorway driving rules and, in the map section, the new motorways and roads recently opened or due to be opened during the currency of the book. In addition, the general layout and typography have been improved, making it easier to find information wanted and hence to benefit from the comprehensive services available to all A.A. members.

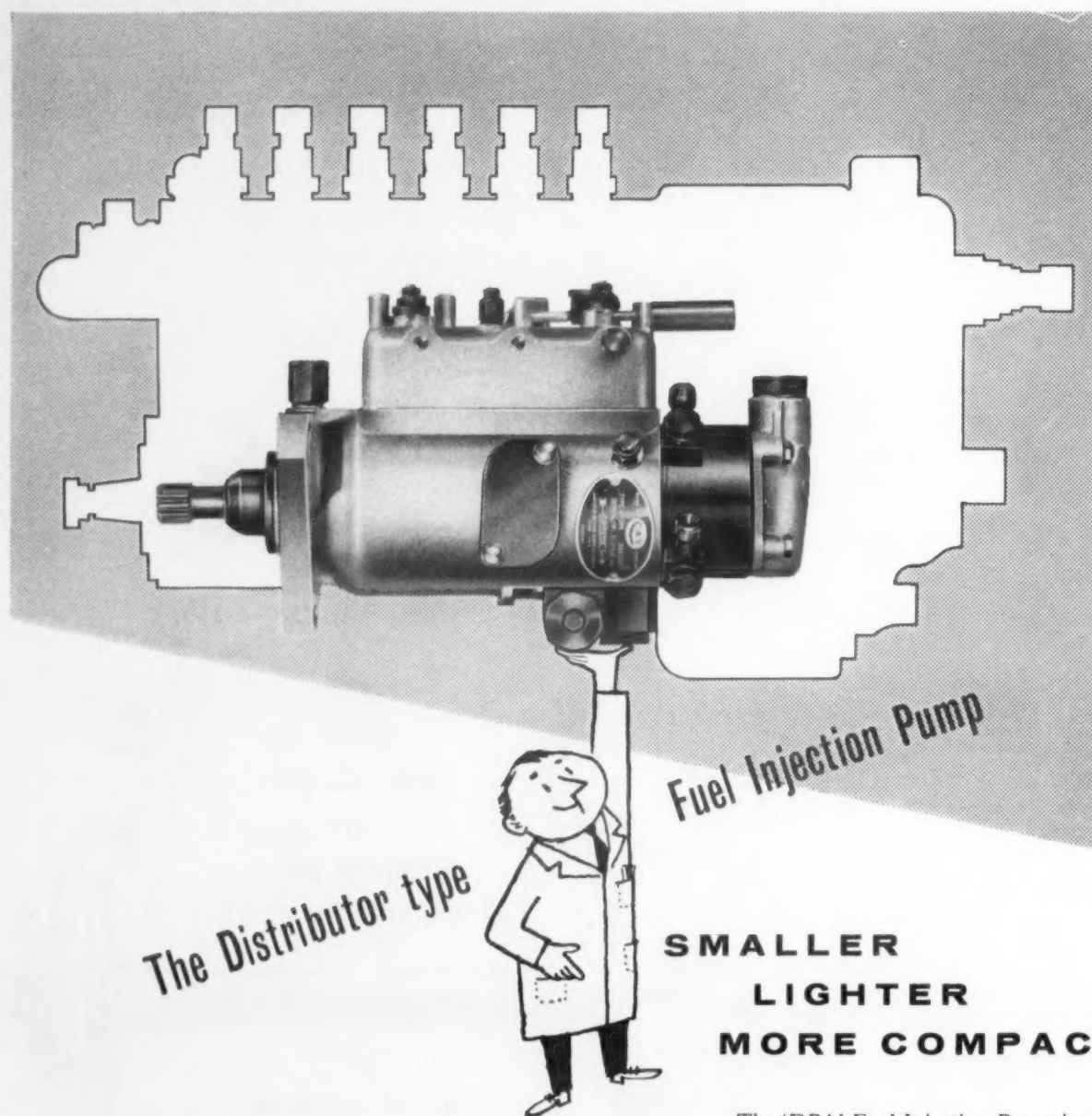
THE DEEP SEA TRAMP. By Captain A. G. Course. (London: Hollis and Carter, 25 Ashley Place, S.W.1. Price 21s.) Well known as an author and broadcaster on shipping subjects, Captain Course has conducted considerable research into the history of a substantial number of major tramp-operating companies and has seized upon various pieces of information and reminiscence to illustrate his theme. It must be said that some of the results are most interesting, but others tend to create rather arid patches in the book. This is a pity, for the author can, and does, conjure up a vivid picture of a ship's history when he is not bogged down in statistical and mechanical detail. This is, in consequence, a volume to attract those already interested rather than the tyros.

ECONOMICS OF CANADIAN TRANSPORTATION (Second Edition). By A. W. Currie. (London: Oxford University Press; also Toronto University Press. Price 64s.) Canadian readers, including university students as well as those engaged in transport by road, rail, sea and air, will find this a most useful, informative and enlightening compendium. Moreover, the book is designed to be helpful to traders who from time to time have to appear before one or other of the regulatory authorities, for several chapters are devoted to the principles and practice of rate-making and to the wide question of undue preference. In fact, this imposing volume portrays a comprehensive picture of the Canadian transport scene which cannot fail to be of absorbing interest to the student in this country and overseas.

FORTHCOMING EVENTS

May 17.—Inst.T. (Humbly Grove). Annual general meeting. Chamber of Commerce and Shipping, Samman House, Bowdley Lane, Hull. 7.30 p.m.
R.Ae.S. (Historical group). Sir Thomas Sopwith, "My First Ten Years." I.Mech.E., 1 Birdcage Walk, S.W.1.
Inst.C.E. D. E. Glover, E. Newton, H. M. Dale and G. A. Plank, "Port of London Authority—Development of Two Dock Areas, 1939." Great George Street, S.W.1. 5.30 p.m.
May 17-20.—Public Transport Association. Conference at Scarborough.
May 18.—I.R.T.E. (East Midlands). Visit to Pirelli, Limited, Derby Road, Burton-on-Trent.
May 19.—Inst.T. (East Midlands). Annual general meeting and film show. Mechanics Institution, Nottingham. 6.30 p.m.
R.Ae.S. 48th Wilbur Wright Memorial Lecture. M. J. Lighthill, "Mathematics and Aeronautics." I.Mech.E., 1 Birdcage Walk, S.W.1. 6 p.m.
May 20.—B.I.R.E. M. James, "Servomechanisms and Electronics Engineers—the Present and the Future." London School of Hygiene, Keppel Street, Gower Street, W.C.1. 7 p.m.
May 21.—R.C.T.S. (South of England). A. F. Cook, "Some Footplate Experiences." Junction Hotel, Eastleigh. 6.30 p.m.

To meet the needs of the rapidly widening circle of users of Simms equipment, Simms Motor Units, Limited, has opened a new branch in south-east London at 114-126 Westmoor Street, S.E.7 (tel. Greenwich 6226). Replacing earlier premises at Blackheath, the new branch covers an area of some 8,000 sq. ft. and has a garage workshop where four 30-ft. vehicles can be serviced simultaneously. The injection pump overhaul shop incorporates a novel feature, devised by Simms engineers, in the form of a fuel spray reclaiming plant, which keeps the atmosphere free from atomised diesel fuel and also reclaims the fuel for further use.



The 'DPA' Fuel Injection Pump is much smaller than the comparable in-line pump for similar duty, and is only a fraction of the weight. It may be mounted horizontally or vertically as desired. It forms a compact unit which fits snugly alongside the engine, with a simple direct drive, and thus permits considerable simplification of engine design with corresponding saving of cost. The 'DPA' pump is suitable for high speed diesels of up to approximately 1.5 litres per cylinder.



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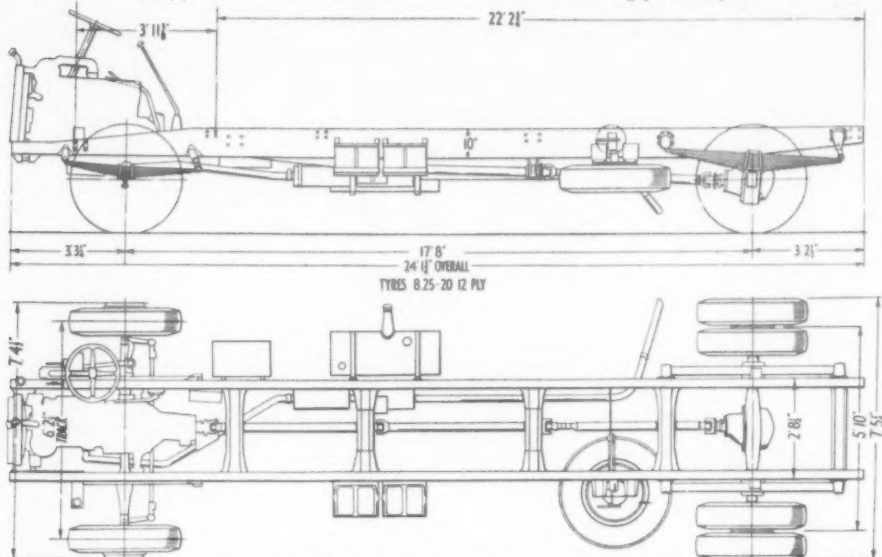
Thames-Duple 41-Seat Diesel Coach*

LIVELY AND ECONOMICAL PERFORMANCE OVER HILLY ROUTE

WITH memories of our participation in a very fast run from London to Moscow and back in an almost identical vehicle last October, when average speed on the outward journey exceeded 51 m.p.h., we approached a recent road test of the Thames-Duple coach under the more circumscribed conditions of our standard test route with a soundly based appreciation of its remarkable

the diesel replaceable wet cylinder liners and a forged-steel seven-main-bearing crankshaft.

Transmission is through a 12-in. single dryplate clutch having hydraulic release mechanism and centrifugally assisted engagement, a four-speed gearbox with synchromesh on second, third and top and a three-piece open tubular propeller shaft with needle-roller-bearing joints; optional rear axles are



Drawing showing layout and principal dimensions of the Thames passenger vehicle chassis

performance in open-road conditions. The test vehicle, carrying the equivalent of a full load of 41 passengers and luggage, performed extraordinarily well during our run along the rather hilly Kent-Surrey border; it had a lively performance matching that of the majority of other vehicles away from traffic checks, very light handling characteristics and a comfortable and quiet ride for the passengers and crew, all with commendable economy.

The Thames passenger chassis, which is designed by Ford Motor Co., Limited, for operation as a

a fully floating hypoid unit with standard ratio of 6.167 to 1 (5.28 to 1 alternative) or an electrically operated two-speed unit, Ford-built with Eaton Series 13500 gear having ratios of 4.5 and 6.25 to 1. Suspension is by conventional semi-elliptic springs, 45 in. long at the front and 60 in. long at the rear, damped all round by lever-type shock absorbers. Standard tyres are 8.25-20 12-ply rating, dual rears, with 9.00-20s optionally available, on three-piece wide-base rims. Hydraulically operated vacuum-assisted brakes 16 in. by 3 in. front and 15½ in. by 5 in. rear provide a total lining

TEST RESULTS AT A GLANCE

Vehicle Details
MAKER: Ford Motor Co., Limited, Dagenham, Essex.
TYPE: Thames-Duple 41-seat diesel coach.
ENGINE: Ford 6D six-cylinder direct-injection diesel, vertical at front; bore 3.49 in. (100 mm.), stroke 4.53 in. (115 mm.), capacity 380.5 cu. in. (5.416 litres); compression ratio 16 to 1; 100 b.h.p. (max.) at 2,500 r.p.m.; 242 lb./ft. max. torque at 1,500 r.p.m.
TRANSMISSION: Clutch, hydraulically operated centrifugally assisted single dryplate, 12 in. (304.8 mm.) dia., 141.4 sq. in. (912.9 sq. cm.) lining area; gearbox, four-speed synchromesh (ex. first), ratios 6.482, 3.092, 1.686 and 1 to 1 forward, 8.007 to 1 reverse; driveshafts, open tubular with needle-roller bearing universal joints and supported intermediate bearings; rear axle, Eaton two-speed 13500 series fully floating spiral bevel, electric gearchange, ratios 4.5 and 6.25 to 1.
BRAKES: Vacuum-assisted hydraulic operation, two-leading shoe front, 480 sq. in. (3,096.8 sq. cm.) total lining area.
TYRES: Standard 8.25-20 12-ply, dual rear; optional 9.00-20.
WHEELBASE: 17 ft. 8 in. (5.385 m.).
WEIGHT: With Duple 41-seat body as tested 8 tons 4½ cwt. (5,308.8 kg.).
PRICE: Standard diesel coach chassis in primer £1,175; with standard 41-seat Duple coach body complete £29,905. Two-speed axle costs additional £100.

Test Results
ROUTE: Standard route in Kent and Surrey with London addition.
CONDITIONS: Fine and cool.
RUNNING WEIGHT: 8 tons 8 cwt. (8,534.8 kg.) plus crew of three.
PAYLOAD: Equivalent to 41 passengers and about 12 cwt. luggage.
FUEL CONSUMPTION: Continuous running over 15 miles in fairly heavy traffic 17.04 m.p.g. (6.03 km. per litre) at 29 m.p.h. (46.4 k.p.h.) average speed.
GROSS TON M.P.G.: 146.5 (52.7 tonnes/km./litre).
MAXIMUM GRADIENT CLIMBED: 1 in 6 (16.6 per cent).
TURNING CIRCLE: 63 ft. (19.2 m.) wheeltrack, 66 ft. (20.1 m.) sweep.
ACCELERATION:
Averages of four runs in low axle ratio, through gears:
0-20 m.p.h. 8.3 sec.
0-30 m.p.h. 17.5 sec.
in top gear low axle ratio:
10-20 m.p.h. 12 sec.
10-30 m.p.h. 25.8 sec.
BRAKING: Average distance to stop in emergency from 30 m.p.h. on dry tarmac 42 ft. (12.8 m.), equivalent of 23 ft. per sec. per sec. or 0.71 g. overall deceleration. (Don meter 70-75 per cent lock, around 30 per cent hand only).
ESTIMATED TOP SPEED: About 70 m.p.h. (112 km.p.h.).
OVERALL FUEL CONSUMPTION: For 87 miles of mainly hard driving, including 20 miles in London suburbs and much low-gear work in various tests, 12.8 m.p.g. (455 km. per 100 litres).

37- to 41-seat coach at a gross weight of 8½ tons, has been developed from the well-established Thames Trader goods chassis, with which it shares many common components, including vertical front engine and gearbox. It has an entirely different chassis frame, however, which is longer and deeper (10 in.) with six crossmembers, and presents a completely flat top from front spring rear hanger brackets rearwards. Rear springs have also been specially developed for the passenger chassis and other differences compared with the

area of 480 sq. in. The chassis is supplied without front-end sheet metal and bumper, but complete with full lamp set (on temporary mounts), instruments and spare wheel and wind-down carrier under the left-hand side of the chassis frame.

Duple Coachwork

General dimensions, which include a wheelbase of 17 ft. 8 in., front track of 6 ft. 2½ in. and rear track of 5 ft. 10 in., are suited to maximum-dimension bodywork and various coachbuilders,



Bold frontal treatment of the Duple Yeoman body applied to the Thames and, right, light and attractive interior of a 41-seat layout



Trader include larger rear brakes, rear track increased by 2 in. to 5 ft. 10 in. and modified steering gear.

Petrol or Diesel

In common with passenger chassis of the other quantity producers, the Thames is offered with either petrol or diesel engine. Both are six-cylinder units, the diesel a direct-injection engine of 330 cu. in. (5.416 litres) capacity producing a maximum of 100 b.h.p. at 2,500 r.p.m. and 242 lb./ft. torque at 1,500 r.p.m., while the 4.9-litre petrol engine develops 114 b.h.p. at 3,500 r.p.m. and has similar torque output to the diesel at 1,500 r.p.m. The petrol engine has a compression ratio of 6.4 to 1 and can therefore satisfactorily digest commercial grades of fuel, though the usual benefits of a cleaner engine and improved consumption would accrue from the use of the regular grades. The petrol engine also benefits from Ford rationalisation of design and production of its commercial vehicle petrol and diesel engines, having in common with

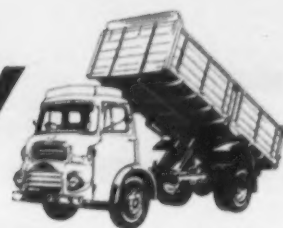
including the Burlingham, Duple, Harrington, Plaxton and Yeates establishments, offer 30 ft. by 8 ft. (or 7 ft. 6 in.) bodies with up to 41 seats, priced at about £22,700, for the Thames. The vehicle tested was fitted with the Duple 41-seat Yeoman body, constructed of that company's lightweight composite metal-reinforced hardwood framing and mainly aluminium panelling. The panelling in fact is all of aluminium except for the lower rear quarters, which are of 20-s.w.g. Zintec steel. The side valances between the axles are detachable and various arrangements of the mouldings of polished light alloy with plastics inserts are available.

The test vehicle had shaped Perspex panels in the front canopy and along the sides of the domed roof, in the centre of which were three large translucent roof lights, the front one a three-way opener and the rear opening at the rear. Balanced full-drop side windows had louvres above, the deep double-curved windcreens swept back into the sides and a large rear window, also with wrap-round corners, incorporated a horizontal-opening

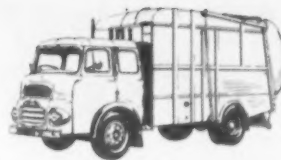
(Continued on page 14)

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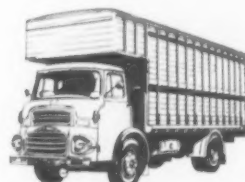
A Chieftain 12½ cu. yard tipping body



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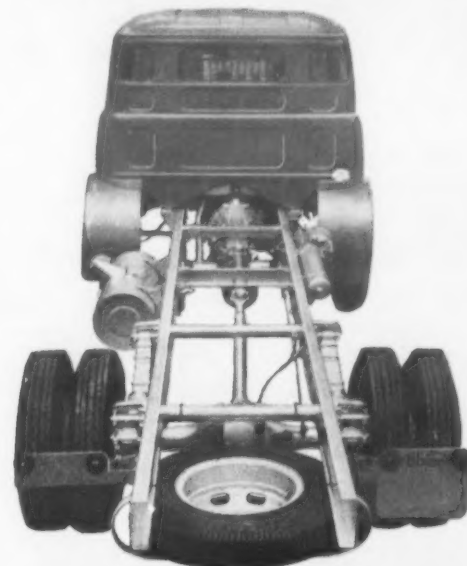


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LIGHTWEIGHT DOORS

Southern Region Uses Bakelite Plastics

RAILWAY carriage doors, which are conventionally made of steel and timber, have been the subject of much experiment over the past few years. The steel product is comparatively heavy, costly in labour and susceptible to corrosion. Against this, it is very robust, not easy to damage and compares favourably in total initial cost with doors made from other materials. If doors could be made lighter, assembly costs would probably be reduced and running costs would certainly be lowered. A saving of only 14 lb. in the weight of each door means that a normal-length suburban train has one ton less to carry. Probably more important, substantial savings would be possible in a design requiring less maintenance, especially if it was also more resistant to damage and distortion.

Doors using light alloys instead of steel have been produced which weigh a little less and, although somewhat more expensive to make, have done very well in trials. They are resistant to corrosion and strong. In addition, they have been found to last rather longer than steel doors, so that they compare well economically. These aluminium doors are now in normal service on new railway stock, notably on British Railways Southern Region main-line routes. An obvious advantage they have over the conventional product is in the use of plastic-faced interior panels, replacing the older leathercloth-covered plywood panels. Many of the aluminium doors have interior panelling of Warerite plastics in various patterns.

The Reinforced Plastics Door

In pursuit of lower maintenance costs, lightness and strength, trials were started several years ago on designs based on reinforced plastics. After preliminary investigations had proved favourable, service tests were carried out on doors made from a structural laminate of Bakelite polyester resin reinforced with glass fibre. Although the materials for the reinforced plastics door cost more, it takes less labour to produce than does the conventional steel door. For at least some types of door, the finished reinforced plastics version costs less to produce than an aluminium one.

In addition the plastics product cannot corrode and is extremely resistant to distortion and impact damage. Compared with other types, it is very light in weight and being more resilient than metal doors, it regains its shape very quickly after severe loadings, without needing periodic adjustment. A special test rig was devised to simulate the effects of continual heavy slamming and was set up so that the three types of door could be compared.

The results showed that the polyester-glass fibre doors had superior qualities to other types tested where resistance to deformation and permanent set was concerned.

Now, Southern Region has put them into normal service on suburban lines. These doors, known as the S.R. type, are in large-scale production at the region's carriage and wagon works at Eastleigh, using a fire-retardant grade of Bakelite resin.



Glass fibre-reinforced Bakelite polyester resin doors produced at Eastleigh works fitted to a Southern Region suburban-service carriage

The production method is fundamentally the simple hand lay-up technique, modified to suit the requirements of this particular job. Layers of chopped-strand glass mat, impregnated with resin, are consolidated in a mould, which is also made of polyester resin reinforced with glass fibre. The inside and outside halves of the door are made separately, and then immediately clamped together. In this way the halves are firmly bonded and both surfaces of the door are smooth. Metal plates for the fixing of hinges, locks and locating pins are moulded into the material during manufacture and a felt-lined steel channel is included to take the sliding window, when fitted.

Originally an independent reinforced-plastics door-well, which drained water out through the bottom of the door, was put between the two halves when they were clamped together; it proved unnecessary and in later versions it is eliminated. Being unaffected by weathering, the doors do not need surface protection and painting is only carried out so that the colour and surface match the surrounding metal parts of the carriage. The surface layers of resin are pigmented green, so that scratched-off paint is not apparent.

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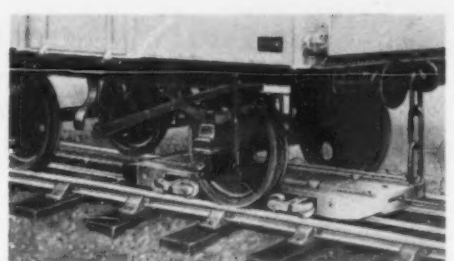
Illustrated is a single compartment 3,190 gallon nett capacity Tanker built to convey tar products. It is steam-coiled and insulated with 2" glass fibre. The tank is arranged for vacuum filling and pressure discharge.

It is only one of a large number, of many different types, now being built in these works.

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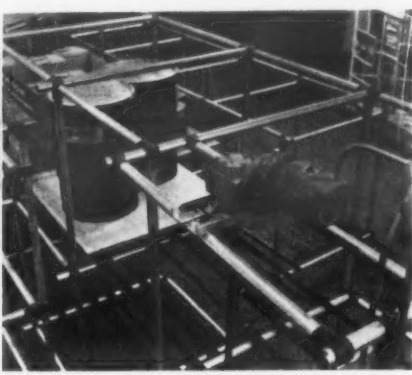
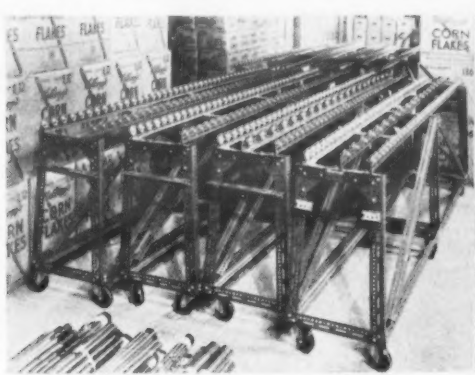
MECHANISED HANDLING IN PICTURES



Centralised control over a number of tracks is possible with the Rendale Dragon system of rail wagon controllers, pushers, retarders and chargers



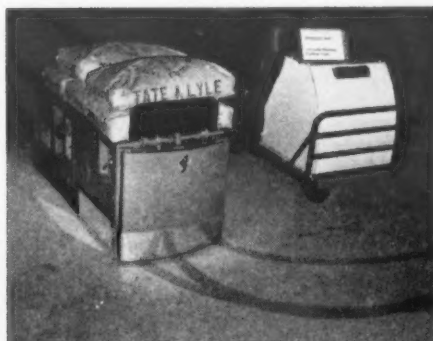
Thames Trader chassis used as the foundation of two mobile cranes, the two-ton Tunny crane with raised cab operating position and the hydraulic Taylor Jumbo 66 with a similar lifting capacity



Dor-to-Dor Carriers (Brighton), Limited, decided on a 200-ft. conveyor made up of Dexion section with Glidewheels and built it for its new Lewes warehouse; when not required it is stored away. On the right, new Gascoigne powered conveyor racking gives storage in depth. The special wheeled stillages are moved on rails via the medium of an endless chain powered by electric motor seen in foreground



Introduced into this country by Powell Duffryn Engineering Co., Limited, the Dempster Dinosaur container system (up to 40 cu. yd.) includes a tipping frame, hydraulic raise and lower cylinders and a double-acting cylinder to move the transfer bail to and fro. The Dempster Dumpster (right) is available in a variety of forms intended for loading or unloading by the vehicle driver without assistance



The Conveyancer E.M.I. Robotug demonstration unit at Earls Court, indicating extreme accuracy of guidance system after many passes. Also on show was the Alf (automatic line follower) which dispenses with the need for underfloor wires. It has photo-electric sensing heads at front and rear, permitting it to follow a painted white line, and painted markers relay stop and routing commands. A proximity head gives early warning of obstacles. Shay Mastiff hand hydraulic stacker (right) brings low-cost mechanisation to the smallest establishment

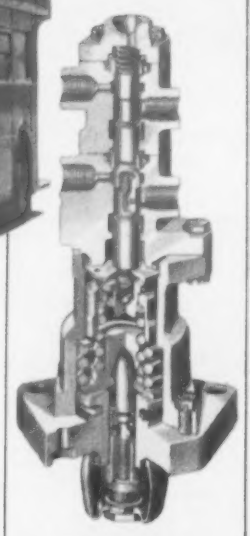


New method of handling shipping containers comes with the Shorland 29 straddle carrier; right, the Dunn Spencer Bulk Flo vehicle loads by suction and has blown discharge. This is a light alloy 450 cu. ft. Tiverton Coachbuilders body on an Albion Clydesdale. Spencer (Melksham) Limited, manufactured the equipment, which includes a Godfrey blower


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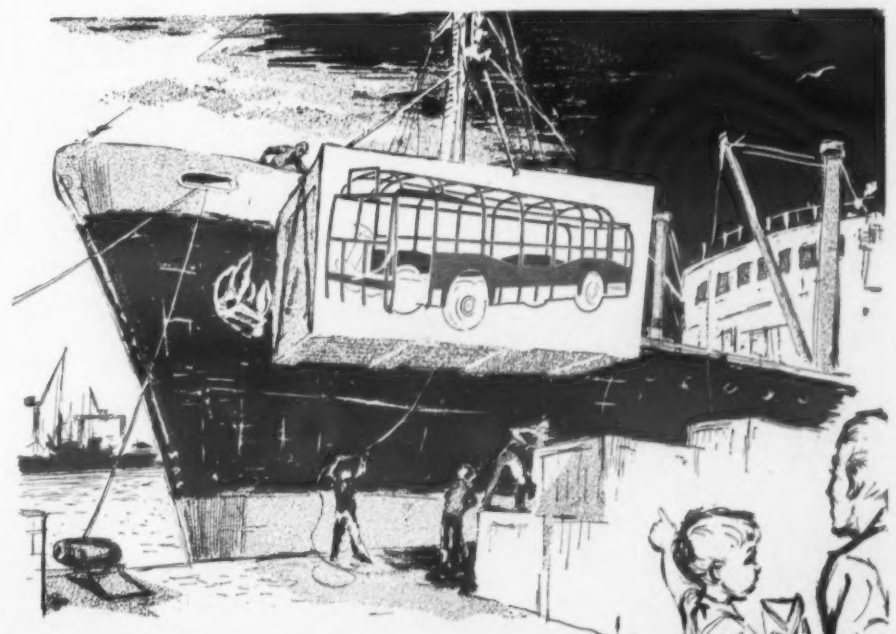


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NUCLEAR-POWERED SHIPPING

A Really Hot Problem

By R. STEWART MacTIER, C.B.E.*

SO far I have been talking about problems which I like to think shipowners have been studying for years, but now I should like to enter the realms of scientific fiction and discuss the really hot problem of nuclear propulsion. The volume of literature on this subject is rather frightening, and to grasp what it is all about is not made any easier by the aura of "topsecretness" which surrounds the subject and the jargon produced by the nuclear physicists. Engineers just "start up" a power plant; nuclear physicists cause their reactors to "go critical," and so on. Worst of all the question of nuclear propulsion at sea as an economic means of transport is deeply prejudiced by issues of "defence" (or, of course, attack) and national prestige.

Reactor Cost

An atomic reactor is just a boiler with the special feature that heat is produced without consuming oxygen or emitting any products of combustion. All the types at present known burn uranium metal, uranium oxide or plutonium. Uranium fuel can be used unenriched as at Calder Hall, when it contains 0.7 per cent of the fissile U235. It can also be enriched by a chemical process, i.e. the amount of U235 can be increased, but this is very expensive. A reactor with its containment and heat exchangers is bulky, heavy and expensive, the last because of the expensive materials used and the very high standard of workmanship required to ensure that there is no leakage of radio-activity. To compare nuclear with conventional power, a 20,000 s.h.p. marine version of the Calder Hall plant—graphite moderated and gas cooled—would weigh about 10,000 tons against a conventional steam turbine plant weighing about 2,500 tons, including the difference in fuel weight. The final cost of the *Savannah* is reported as between £10 million and £15 million. An equivalent ship with conventional machinery, also built in America, would cost about £5 million.

Snags

From the point of view of most shipowners there is another snag about nuclear propulsion. A reactor core must be of a certain minimum size, called its "critical mass," before the heat-producing chain reaction will take place, and no reactor has been produced so far that will combine reasonable fuel economy with reasonably small output. *Nautilus* has a fairly small reactor but uses highly enriched and so very expensive fuel. In the types of reactor so far considered for merchant ships—using natural or only slightly enriched uranium fuel which is reasonably cheap—the minimum practicable size of reactor will generate steam equivalent to at least 20,000 s.h.p. The vast majority of deep-sea merchant ships require machinery of 5,000 to 8,000 s.h.p. Twenty thousand s.h.p. gets one into the monster tanker and large passenger ship range.

A further difficulty about the atomic ship is that it is not easy to manoeuvre. Reactor output can be varied by use of the neutron-absorbing control-rods, but it cannot be completely shut down without introducing Xenon poisoning, which kills the core stone dead for 24 to 36 hours. The possible outcome of damage in collision or other happening create a most formidable obstacle to acceptance as a normal trading unit in ports.

Standing Charges

Capital cost and standing charges of the atomic ship are going to be very high. This means that high utilisation is essential and so almost inevitably, in the initial stages, nuclear-propelled ships will be tankers, which can achieve 300 days a year at sea, ore carriers or pure passenger ships. As far as actual fuel costs are concerned, natural or slightly enriched uranium is a cheap fuel. At current U.K. production costs, natural uranium fuel works out at about 0.2d. per s.h.p./hour, and the slightly enriched fuel now proposed for ship propulsion at between 0.30d. and 0.35d. per s.h.p./hour, as compared with a conventional steam-turbine plant burning furnace oil at 0.43d. per s.h.p./hour.

One must treat figures of nuclear fuel costs with caution. In a uranium fuel element it is only the fissile U235 that is burnt up, and of this only about 30 per cent can be used before the fuel element must be taken out for reprocessing. But for every gramme of U235 which is burnt, 0.8 grammes of the fissile element plutonium is bred and this is separated out in the reprocessing. The real cost of uranium fuel, therefore, depends to a large extent on what the Government is prepared to pay for plutonium. At the moment there is a brisk demand for plutonium for the purpose of ensuring that we can blow up any enemy while at the same time being blown up ourselves. At some stage, however, saturation must be reached in nuclear weapons, and my guess is that this will be within the next ten years.

Plutonium Paradox

At this stage the value of plutonium should drop considerably, especially as by that time it will be bred in large quantities by every power-station in the world which is burning uranium. It might be concluded from this that the cost of uranium fuel will rise. In fact, however, plutonium itself is a fuel quite as valuable as uranium but more difficult to burn, so that it may well be that plutonium will prove to be the cheap residual fuel on which marine propulsion will eventually be based.

I said that I would not speculate about the future of nuclear propulsion, but I cannot resist the temptation of suggesting some lines of thought which may stimulate others to do so.

- Because of its high capital cost and low fuel cost nuclear power is at its economic optimum in continuous running plant. The ideal application is, therefore, basic-load power-stations.
- For warships, nuclear propulsion is fabulously extravagant, but the tactical advantages are so enormous—particularly for submarines—that atomic navies are a certainty. I wonder whether those who direct our policy in relation to escort ships quite realise what a formidable weapon the atomic submarine is—30 knots and unlimited underwater endurance? What happens if no one has the nerve to use the "nuclear deterrent" and we have to fight a conventional war against such submarines?
- The merchant ship with its varying power requirements and time spent in port with machinery shut

down is not a good proposition for nuclear power. But we cannot exist without sea-borne supplies, and if these depend on oil as they do today I cannot help feeling that as a nation we shall realise the stark necessity of putting money and effort into the development of an alternative source of power to drive the ships on whose survival our existence as a nation depends.

New Economic Factor

Apart from strategic considerations it may be that nuclear power will introduce a completely new factor into the economics of sea-carriage. Nuclear fuel is comparatively cheap, and many disadvantages of nuclear propulsion arise from the enormous weight, size and cost of the containment, which varies little whether your s.h.p. is 20,000 or 40,000. It may be, then, that the big fast ship will become more and more attractive, and we can think perhaps not of a 16-knot tanker but of a 30-knot tanker.

From this arises a further thought. At high speeds wave resistance to the conventional surface displacement ship causes the power-speed curve to rise very sharply. In such conditions a hull running totally submerged requires less power than a hull of similar displacement running only partly submerged, as in the case of the conventional ship. This, of course, is the theoretical background of the nuclear submarine tanker proposal. The practical objections are that, firstly, the pressure hull of a submarine would have to be much heavier than the equivalent surface ship and so, on comparable displacement, the submarine would carry less cargo; secondly, the submarine hull would be far more expensive; and lastly, the difficulties of finding suitable terminal facilities for a submarine tanker would be formidable. However, it is an attractive thought that in time of war we might be able to get oil from the Alaskan field by submarine under the North Pole; on that note of fantasy I will conclude.

PUBLICATIONS RECEIVED

CROFTS FREE SPACE HYDRAULIC COUPLINGS AND DRIVES. A brochure issued by Crofts (Engineers), Limited, Bradford, 3, describing and illustrating a new type of "free-space" hydraulic coupling for the design of which the company has made patent application. Distinct advantages over other types of hydraulic coupling are claimed for the Crofts unit, which does not use bushes or loose parts to give particular driving results. Free Space couplings and drives are available from stock up to 100 h.p. and units are produced to order in capacities up to 700 h.p.

IMPALCO ALUMINIUM ALLOY TREADPLATE. A new brochure issued by Imperial Chemical Industries, Limited, Millbank, London, S.W.1, describing two types of non-slip treadplate in aluminium alloy developed by its subsidiary company, Imperial Aluminium Co., Limited. Full specifications are given and typical industrial and transport applications are illustrated.

RAPIER SELF-PRIMING WATER PUMPS. Three leaflets issued by Ransoms and Rapier, Limited, Watford, Herts., describing the company's self-priming water pumps ranging in capacity from 10,000 gal. (12,000 U.S. gal.) per hr. to 25,000 (30,000 U.S.) g.p.h.

LOADING RAILWAY WAGONS is the self-explanatory title of a booklet issued by East African Railways to private siding owners and others loading railway wagons.

1959 EDITION OF THE P.I.B. WORLD OIL MAP. This coloured map shows the world's oil producing and refining countries with symbols indicating their relative importance based on statistics for 1958. In addition there are tables giving the relevant figures of oil production and refinery capacity, a diagram indicating the principal countries from which the U.K. imported its crude oil and refined products, and a graph illustrating the remarkable growth since 1900 of oil production in various areas. The price is 2s. post free (U.K.) from Petroleum Information Bureau, 29 New Bond Street, London, W.1.

A SIMPLE GUIDE TO PROSPECTIVE EXPORTERS. The Gauge and Tool Makers' Association, Standbrook House, Old Bond Street, London, W.1, has produced this guide with the particular object of assisting firms wishing to enter the field of overseas trading for the first time. The subjects dealt with include representation in foreign markets, how to appoint an agent, methods of export, methods of payment, and so on. Copies are available at 3s. 6d. each, post free, from offices of the association.

ADHESIVE BONDING OF ALUMINIUM. A new booklet available from Reynolds Metal Company, Dept PRD-21, Richmond, 18, Virginia, U.S.A., presenting comprehensive information indicating that recent advances in adhesive materials have made their use in joining aluminium very advantageous in certain applications. Information is confined mainly to structural adhesives, since design engineers are primarily interested in adhesives that will withstand stress.

RIGIDEX—THE POLYETHYLENE PLUS. The impact now being made on modern industry by the introduction of Rigidex high-density polyethylene is well demonstrated in this new publication issued by British Resin Products, Limited. The booklet outlines the increasing use of Rigidex in many different industries and walks of life and shows how the superior properties of this new rigid polyethylene are making more things possible in plastics.

ROMAC GENERAL ACCESSORIES CATALOGUE. Making the 35th anniversary of its service to the motor and cycle trades, Romac Industries, Limited, has issued this new comprehensive catalogue, which describes and illustrates the company's entire range of vehicle accessories and garage equipment. Prices are not included.

TRINITE TILAMITE. A new brochure published by George Angus and Co., Limited, Angus House, 152-158 Westgate Road, Newcastle upon Tyne 1, which describes the company's current standard range of brake and clutch linings designed for heavy-duty vehicle and industrial applications (BK/R3/59). The third publication in the range of technical sales literature on Rocksil rock wool insulation products just published by the manufacturers, the Cape Asbestos Co., Limited, deals with applications for transport, kitchen equipment and piping. Details and illustrations are given of the range of products and their applications, including structural and acoustic insulation of railway carriages, insulated and refrigerated railway wagons and motor vehicles, road tankers, caravans and containers.

FORGING IN MAGNESIUM ALLOYS. A new booklet published by High Duty Alloys, Limited, Slough, Bucks., giving technical information on three Magnesium alloys and on a magnesium-zinc-zirconium alloy, which the company manufactures in the form of ingot, billets, forgings and extrusions, under licence from Magnesium Elektron, Limited.

A NEW LIGHTING RANGE BY BENJAMIN. A new brochure published by the Benjamin Electric, Limited, Brantwood Road, London, N.17, describing the range of Litemaster fluorescent lighting fittings, described in MODERN TRANSPORT of February 27.

ROCOL—FIRST IN MOLYBDENUM DISULPHIDE LUBRICATION. Published by Rocol, Limited, Swillington, Nr. Leeds, pioneer of practical molybdenum disulphide lubricants, this well-produced illustrated booklet shows how the raw materials are purified and prepared, the results of tests on various types of equipment and describes their salient properties. Tables list the various Rocol lubricants and detail their applications.

ON RETAINING BEARINGS. A new catalogue just issued by and obtainable from Bound Brook Bearings, Limited, Trent Valley Trading Estate, Lichfield, Staffs., describing the company's range of oil-retaining Lubrook and Ferroco bearings. Basic information on the production of these bearings using the powder metallurgy process is given, with tables of standard limits and tolerances, installation data, physical properties, notes on machining and a selection of current applications.

CASTROL ACHIEVEMENTS 1959. Once again Castrol's 48-page achievements book is published presenting a kaleidoscope of a year's motor sport in exciting pictures and many facts and figures about races, rallies, records, trials and scrambles in all parts of the world. The book is obtainable free from C. C. Wakefield and Co., Limited, Castrol House, Marylebone Road, London, N.W.1.

THE FIGHT AGAINST FRICTION. A comprehensive booklet on the use of molybdenum disulphide as a lubricant supplement published by the Slip Group of Companies, 34 Great St. Helens, London, E.C.3, manufacturer of MolySlip.

THE GEON STORY. PVC is processed by the plastics industry into a number of characteristic secondary forms—plastics sheeting, leathercloth and coated fabrics; piping, sheet and cellular products in both flexible and rigid forms. These secondary vinyl materials are fabricated into a variety of finished products such as rainwear, curtaining, industrial protective clothing "oilskins," furniture and vehicle upholstery or fishing floats. They are also employed in the construction of chemical plant, for water piping and thermal insulation. These and other typical applications, and tolerances, floorcovering and tiles, are described and illustrated in a new edition of *The Geon Story*, published by British Geon Limited, Devonshire House, Piccadilly, London, W.1.



Co-operating in British Railways 50 cycle 25 kV Electrification

The multiple-unit trains built by British Railways at York and Doncaster have been in service on the COLCHESTER-CLACTON-WALTON Electrified section of the Eastern Region since April, 1959. They are fitted with

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South Africa—Westinghouse Brake & Signal Co. S.A. (Pty.) Ltd., Johannesburg
Agents:—Bellamy & Lambie, Johannesburg

* Abstract of Institute of Transport Annual Shipping Lecture. The author is a partner in Alfred Holt and Company and a director of Glen Line, Limited.

A FORWARD-ENTRANCE BUS

Latest A.E.C.-Park Royal Bridgemaster for South Wales Transport

2—EQUIPMENT AND MECHANICAL UNITS*

EASY access to the door gear of the latest A.E.C.-Park Royal Bridgemaster is provided in the upper saloon, where the installation is covered with a chequered aluminium cowl. The staircase is of the spiral type with chequered alloy risers and a feature of the complete front end layout around this area is that the design permits an easy flow of passengers to both upper and lower saloon

14 in the upper saloon, and a flush-fitting lamp above the entrance. A bell and buzzer, mounted in the driver's cab for signalling purposes, is operated by bell push, placed at convenient points. At the front end a destination, auxiliary and triple service number indicator is incorporated. The main and auxiliary indicators are equipped with tandem type under-drive gears operated from below, with the destination indicator operated from inside the driver's cab.

The Mechanical Units

Mechanical components are generally similar to those of the established rear-entrance Bridgemaster with the exception that a transfer box is employed to lower and slightly offset the line of drive. The front sub-frame is of a pressed steel channel section construction with the cross-members carrying the engine, radiator, gearbox, suspension and controls. The engine is the A.E.C. AV590 six-cylinder direct-injection vertical diesel developing 125 b.h.p. at 1,800 r.p.m. and producing 430 lb. ft. torque at 1,100 r.p.m. It is of monobloc construction incorporating wet cylinder liners. A hydraulically-operated 15½-in.

diameter single dry plate clutch is used having a friction area of 320 sq. in. The gearbox is bolted up in unit with the flexibly-mounted engine. It provides four forward speeds having inertia lock-type synchromesh engagement, and one reverse. The ratios are 4.64, 2.55, 1.65 and 1 to 1, with a 4.13 reverse gear.

The transmission transfer box, with 1 to 1 ratio, is bolted on to the rear of the main gearbox and consists of a simple train of three helical gears. The input shaft is mounted on a ball bearing at the front and a parallel roller bearing at the rear, whilst the output shaft has taper roller bearings. The gears are of controlled grain nickel-chromium

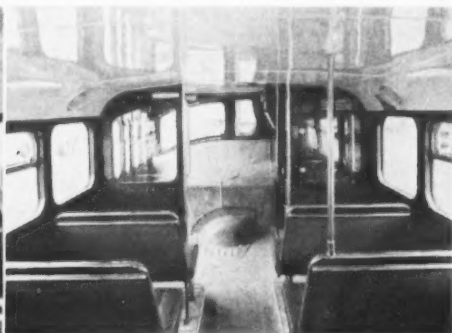


The front-entrance Bridgemaster for the South Wales Transport Co., Limited

gangways, which will be of great assistance at peak-hour loading and unloading. The intermediate floor is arranged to allow adequate headroom at the bottom staircase step, and seven risers are used in a generous longitudinal rising area dimension of 52 in.

Glazing

A combination of alloy pan and direct rubber glazing is incorporated and all glass is 32 oz. toughened sheet, except for the double-panel windscreen, glazed in ½ in. thick laminated safety plate glass. Six top double sliding windows in polished alloy frames are fitted to the lower saloon,



Interior views of the upper and lower deck of the forward-entrance 72-seat Bridgemaster

eight to the upper saloon and opening vent windows are fitted to the upper saloon front end and nearside front end lower saloon. Extractor ventilators are fitted to the rear in each saloon with intake at the front. Saloon heating is achieved by two recirculating heaters fitted below the seats in each saloon and the complete installation is wired through the dynamo.

Seating is provided for 72 passengers, arranged with 29 in the lower saloon and 43 in the upper saloon. The transverse two-passenger and single-passenger seat frames are the tubular type with stainless steel double top rails, fitted with sponge rubber cushions and rubberised hair squabs, and covered in pleated blue hide. Suitable silver anodised aluminium alloy stanchions and grab rails are distributed throughout both saloons. The wheelarch handpoles and seat top rail to roof stanchions are in stainless steel.

Equipment

The interior of the vehicle is to a paint finish throughout in blue with window finishers stove enamelled; chequered aluminium is fitted at main wearing positions. Ceiling and covers are in white and below vent rails the finish is completely in blue. The floors have a 2 mm. thick blue p.v.c. covering with a plastics-cork composition fitted down the main gangway; fluted aluminium alloy treadplates are provided between seats.

The lighting system is 24-volt and batteries are housed below the lower saloon rear seats. There are 10 enclosed lamps fitted in the lower saloon,

steel with case-hardened teeth and ground profiles, to ensure silent operation. Lip type oil seals retain the lubricant.

Propeller Shaft

The two-piece propeller shaft incorporating a transmission vibration damper takes the drive to the offset double reduction rear axles. The axle casing is a cast steel tube below hub height, with cast reduction casings at each end. This stepped arrangement allows for a low central gangway in the lower saloon. The primary reduction is by spiral bevel wheel and pinion, ratio 1.88 to 1. The final reduction is by spur gears at each side, and variations provide overall ratios of 6.2, 5.75 or 5.35 to 1.

The independent front suspension incorporates unequal length wishbones with coil springs, inside which are telescopic hydraulic dampers. A.E.C. worm and nut steering is fitted. At the rear the air suspension system so successful on the rear-entrance Bridgemaster is retained. The axle is attached by rubber mountings to two channel section radius arms which are pivoted in rubber bushes at the front and which have two 12-in. diameter rubber bellows suspension units with surge tanks on a wide base at the rear. A constant height levelling valve system is used with lever type hydraulic dampers. To safeguard braking a separate reservoir charged through a diverter valve provides suspension air. Front and rear brakes have 15½-in. diameter drums and operation is by S-shaped cams with worm and wheel adjusters. Tyres are 11.00 by 20 14-ply rating single front and 9.00-20 12 ply twin rear.

* No. 1 appeared May 7



A prototype bus in its first week of service after purchase by Belfast Corporation is this Leyland Atlantean with 77-seat Alexander body



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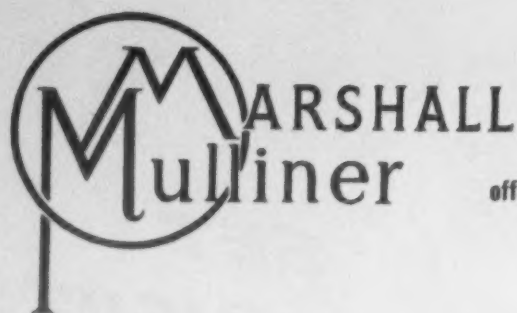
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NEWS FROM ALL QUARTERS

Modernisation Plan in Italy

The Italian Transport Ministry is studying a new ten-year plan to overhaul the entire rail system at a cost of 600,000 million lire. Similar work is already in progress at a cost of 400,000 million lire.

U.S. Rail Union Headquarters

A new \$3 million seven-storey building, the home of U.S. railroad unions, was ceremonially opened in Washington recently. The Railway Labor Building will house the Washington offices of the standard railway unions and the Railway Labour Executives Association.

Rebuilding of Arched Railway Bridge

An ornate wrought-iron bridge over the electrified line at Jesmond Station, which is being rebuilt by the North Eastern Region, was built in 1864 by the Blythe and Tyne Railway. Originally a branch from Backworth to Newcastle, this line provided a competitive route to that of the North Eastern Railway between Newcastle and Tynemouth. It is now unfit for modern road traffic.

Coast to Coast in Colombia

A double-track railway almost 1,000 miles long will link the Caribbean and Pacific coasts of Colombia by the end of this year, with the completion of the Atlantic Railway, a line connecting Bogota with Santa Marta on the Caribbean. The Pacific Coast terminus is the port of Buenaventura. The economic significance of the railway will be profound as it will enable Colombia to ship goods from either coast, thus opening new international trade horizons and spurring industrial development.

Africans to Get Railway Opportunities

The Ministers of Labour in Northern and Southern Rhodesia have submitted proposals to the National Industrial Council for the railways regarding advancement opportunities for Africans. The proposals would abolish all colour bars to employment opportunities in principle. In practice, non-European advancement would probably be confined to an area of 17 jobs. It is also proposed to establish five new job categories, which would carry minimum wage rates ranging from £12 to £28 a month, to provide realistic African advancement opportunities.

English Steel Corporation Works Programme

The English Steel Corporation, Limited, has obtained the consent of the Iron and Steel Board to further developments at Tinsley Park, Sheffield. The scheme has the support of the British Iron and Steel Federation. It is proposed to replace billet mills installed at River Don and Stevenson Road works more than 40 years ago with a modern installation comprising one 42-in. blooming mill and two 32-in. billet mills which will permit more economical production of a larger volume of alloy and special carbon steel billets. The capacity for billet production will be increased by 250,000 tons per annum, some of which will be processed in other plants of the Group. In addition, the bar rolling mills at River Don works are being replaced by new mills which will give an anticipated additional output of 60,000 tons per annum.

Largest Travellers' Cheque

The world's largest denomination travellers' cheque is being issued by Thos. Cook and Son, Limited, as from this month. It is for \$250 (approximately £90) the first travellers' cheque of this amount available.

Colchester Dive-Under

Work has begun on a 1,200-yd. dive-under at Colchester which will enable Clacton-bound trains to pass under the main lines, thus avoiding conflicting train movements over the electrified main lines to London. The speed limit will be raised to 90 m.p.h. for main-line trains.

Transfer to Rhodesia Railways

The Central African Federal Government is to transfer ownership of the Beitbridge Railway to Rhodesia Railways. The section owned by the Government of Rhodesia and Nyasaland runs from the centre of the bridge on the Limpopo river to a terminus about one mile inside Southern Rhodesian territory.

Euston Great Hall Report

London County Council consultants advising on the reconstruction of Euston Station have reported that it is not possible to produce a workable scheme to meet the railway requirements and preserve the Great Hall. The consultants endorse the committee's view that the Doric arch could and should be re-erected on another site; they feel that, ideally, it should stand astride one of the main pedestrian approaches to the station.

Mr. Cube Helps Road Safety

In its drive to cut down the road toll this summer, the Ministry of Transport has invited the co-operation of Tate and Lyle, Limited, in giving wider publicity to the Highway Code, and the company has agreed. During the next five months the wrappers of about a million and a half sugar packets a day issued through normal trade channels will have pictures of Mr. Cube giving safety advice. The theme and the symbol illustrating the Ministry's basic slogan—"Stop accidents—honour your code"—will be changed each month. Road safety posters will also be shown on the 400 Tate and Lyle vans.

New Methods for Hyde Park Schemes

The greatest assembly of plant and equipment used on any London road building operation since the war is being employed on the £3 million Hyde Park Corner—Marble Arch improvement scheme, say the group contractors, Cubitts Fitzpatrick Shand. Among the new-to-Britain techniques will be an Italian method of providing support to the sides of the excavation for the tunnel which is up to 50 ft. deep, before large-scale excavating begins. Special equipment and key personnel will be brought from Italy for this part of the work which would normally have involved driving steel or concrete piles, an expensive and much noisier operation. A central concrete-mixing plant will incorporate the latest type of Swedish turbo mixer which greatly speeds batch mixing times compared with conventional plant.



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Shipping and the Air

FURTHER SERVICE INCREASES

IN his speech to the annual general meeting of the Cunard Steam-Ship Co., Limited, the chairman, Sir John Brocklebank, referred to its acquisition of control of Eagle Airways and its associated companies and to discussions with B.O.A.C. and other transatlantic carriers regarding the possibilities of air-sea interchange, while retaining the benefit of return fare rates. There was no doubt that the advent of the Boeing 707 and the de Havilland Comet 4 on the North Atlantic had made a measurable improvement in comfort, time and, above all, convenience to passengers who used these pure jet aircraft. The international airlines were catering for an enormous increase in total traffic between North America and Europe. Nonetheless the Cunard carryings so far and particularly the first class, showed healthy prospects for the year. He was more than ever convinced that sea should be complementary to rather than competitive with the air.

Royal Passenger on Inaugural Service

When Scandinavian Airlines System inaugurated Caravelle operation between London and Copenhagen on May 7 the passengers on the flight included Queen Ingrid of Denmark who was returning from London where she had attended the wedding of H.R.H. Princess Margaret and Mr. Antony Armstrong-Jones.

T.W.A. to Increase London Service

Trans World Airlines announced on May 10 that from May 26 its 707 Intercontinental services from London to New York would be increased to provide two flights a day in each direction. Both flights will operate at a new, faster crossing time from London to New York of 7 hr. 25 min. for the 3,400-mile journey. T.W.A. eastbound transatlantic flights to London would take 6 hr. 30 min. The new service would leave London at noon and arrive in New York at 2.25 p.m. local time. The other flight will, as now, operate to and from Frankfurt.

Flying Tiger Traffic

March air freight revenues of the Flying Tiger Line set a new record for the month at \$1,278,629 but total freight traffic for the first quarter of 1960 showed a small decline from last year, it has been reported by Mr. John L. Higgins, vice-president. March revenues were approximately 3 per cent above the 1959 total of \$1,239,460 and for the first quarter traffic totalled \$3,394,732 compared with \$3,457,697 last year. The decrease was attributed to a short strike of navigators during February and a threatened pilot strike in January which resulted in a diversion of business, Mr. Higgins said.

More Swissair Eastern Flights

From May 22 Swissair is introducing a third flight weekly to the Far East, leaving Europe on Sundays and terminating in Tokyo. It will also call at Karachi, Calcutta, Bangkok and Hong Kong. In the opposite direction, the new flight will leave Tokyo for Europe on Wednesdays. From May 27, the present flight SR 502, leaving Zurich on Fridays, will terminate in Hong Kong, with government approval being awaited for its extension to Tokyo. Other increases in Swissair's eastern services include a second flight weekly to Tehran on Saturdays, from May 21, and a third weekly flight to Tel Aviv on Mondays from July 18. The increase in the Tel Aviv services coincides with the introduction of Caravelles on this route.

New Services Approved

The Minister of Aviation, after considering the recommendations of the Air Transport Advisory Council, has approved the operation of the following services:

An internal service by Dan-Air Services, Limited, on the route Bristol-Liverpool between April and October each year until October 31, 1960.

An internal service by Dan-Air Services, Limited, on the route Bristol-London (Gatwick) between April and October each year until October 31, 1960, and commencing this season on July 15, 1960.

A normal scheduled service by B.E.A. on the route London-Düsseldorf and/or Cologne and/or Berlin from May 1, 1960, to April 30, 1967.

An inclusive tour service to be operated by Transair, Limited, between Gatwick and Tarbes from April 22 to October 31, 1960.

A normal scheduled service by Airlines (Jersey), Limited, between Exeter and Dublin from June 24, 1960, until April 30, 1965.

K.L.M. To Name DC8 "Sir Frank Whittle"

K.L.M. (Royal Dutch Airlines) is to name its third Douglas DC8 (PH-DCC) "Sir Frank Whittle." Furthermore, Sir Frank has agreed to perform the naming ceremony of this aircraft at London Airport on May 17. K.L.M. is naming its 12 DC8 aircraft after famous aviation scientists and Sir Frank is included for his work on development of jet propelled engines. Others after whom they will be named include Thomas Edison, Anthony Fokker, Guglielmo Marconi, Orville Wright and Albert Plesman, the founder of K.L.M. The DC8 PH-DCA *Albert Plesman*, which is now in service between Amsterdam and New York, is the new flagship of the K.L.M. fleet. May 17 also marks the 40th anniversary of the K.L.M. service between London and Amsterdam and it is hoped that Capt. H. (Jerry) Shaw, the pilot of the first flight, will be aboard the DC8 on its flight on that day from Amsterdam to London.

February Activity at British Aerodromes

Air transport movements at United Kingdom aerodromes in February numbered 20,025, an increase of 28 per cent compared with February, 1959; the number of passengers handled increased by 42 per cent to 415,865, and freight picked up and set down amounted to 16,534.5 short tons, an increase of 69 per cent. Airports in the London area as a whole showed an increase of 22 per cent in air transport movements and an increase of 40 per cent in the number of passengers handled. At London Airport there were 7,971 air transport movements, an increase of 25 per cent compared with February, 1959, and 247,424 passengers were handled, an increase of 48 per cent. Most airports showed increases in passenger traffic over February, 1959, and amongst these were Birmingham (Edmond) by 174 per cent to 9,987, Southend (Rochford) by 149 per cent to 4,583, Edinburgh (Turnhouse) by 118 per cent to 10,282, Ferryfield by 75 per cent to 2,998, Manchester (Ringway) by 58 per cent to 31,079, and Glasgow (Renfrew) by 53 per cent to 29,582. Other large increases in passenger traffic were at Newcastle (Woolsington) by 342 per cent to 2,764, Leeds-Bradford (Yeadon) by 212 per cent to 867, Lympne by 64 per cent to 1,485, Southampton (Eastleigh) by 55 per cent to 1,427, and Cardiff (Rhoose) by 53 per cent to 1,616.

INSTITUTE OF TRANSPORT PRESIDENT-ELECT



K. W. C. Grand

Mr. K. W. C. GRAND, M.Inst.T.

Elected president of the Institute of Transport for 1960-61—he will take office in October—Mr. Keith Walter Chamberlain Grand succeeded the late Mr. James Watkins as a member of the British Transport Commission in February, 1959, having previously been general manager of the Western Region of British Railways. Born on July 3, 1900, he was educated at Rugby and entered Great Western Railway service in 1919 at Park Royal goods station. After gaining experience there, at Ealing Broadway, and in the divisional superintendent's office at Paddington, he was transferred to the general manager's office in 1922. In March, 1926, he was appointed general agent, G.W.R., for U.S.A. and Canada. He was appointed assistant publicity agent, Paddington, in May, 1929, becoming commercial advertising agent a year later, commercial advertising and publicity agent in October, 1931, commercial assistant to superintendent of the line in July, 1933, and general assistant to superintendent of the line in August, 1934. In March, 1936, he was appointed divisional superintendent, Swansea, from which position he returned to the Paddington headquarters in October, 1937, as an assistant to the general manager. In 1939 he was appointed principal assistant to the general manager, from which position he was promoted in 1941 to that of assistant general manager, Great Western Railway. In 1941 also Mr. Grand was appointed by the Railway Executive Committee as liaison officer to the Director-General of the Home Guard, with the rank of colonel. He was also in charge of G.W.R. air raid precautions and fire fighting arrangements. He became chief regional officer, Western Region, upon nationalisation on January 1, 1948. He took an important part in the development of railway-operated air services and was responsible for the introduction of the first service between Cardiff and Plymouth in 1933. Subsequently he served on the boards of Railway Air Services, Limited, Great Western and Southern Air Lines, Limited, Guernsey Airways, Limited, Jersey Airways, Limited, and Channel Islands Airways, Limited, while he was also a director of British and Foreign Aviation, Limited, and chairman of Olley Air Service, Limited. He has served on the boards of a number of railway-associated bus undertakings and is a director of Accumulator Patent Holdings, Limited, the Penarth Pontoon, Slipway and Ship-Repairing Co., Limited, and its associates and is chairman of the Fishguard and Rosslare Railways and Harbours Company. Mr. Grand was chairman of the Railway Clearing House in its last days as a statutory body from 1953 to 1955 and has since served as chairman of the B.T.C. Railway Clearing House Committee. He was appointed a member of the Coastal Shipping Advisory Committee in 1959. He has served since that year as a vice-president of the Institute of Transport, having been a member of council 1944-47 and 1956-59. He was awarded the American Medal of Freedom with Bronze Palm for his services to the United States during the war.

IN PARLIAMENT

Next Road Programme

MINISTER NOT TO BE DRAWN

WHEN he was asked if he was prepared to announce the next road programme, the Minister of Transport, Mr. ERNEST MARPLES, said he had no news at the moment. In the course of subsequent questioning Mr. Marples countered criticisms by saying that we were already spending more now than ever before in the history of this country. Mr. A. F. Holt asked him whether he would agree that the programme meant spending between £60 million and £70 million a year for the next few years, whereas when he (Mr. Marples) went to the Ministry he went with the idea of spending a great deal more money. Could he confirm whether he had asked the Cabinet for more money, and was it true that he had been refused? Mr. Marples: "Even if I could confirm it, I would not."

Mr. P. NOEL-BAKER asked whether, in view of the figures the Minister had quoted of his expenditure, he would recall that the cost of congestion on the roads was now estimated at £500 million a year, and that the cost of road accidents was at least another £200 million to the nation. Would he calculate the capital sum on which £700 million was the annual interest? Mr. Marples: "Many people make these calculations, and I notice that there is an astonishing variation between the highest and the lowest cost. I do not accept them at their face value."

No Direction on Railway Timetables

The Minister of Transport, Mr. ERNEST MARPLES, refused in a written reply to accept the suggestion of LIEUT.-COLONEL W. BROMLEY-DAVENPORT that a general direction should be given to the British Transport Commission to extend summer train services at least until the end of September.

Maidstone Bypass Delay

In a written reply to Mr. J. WELLS, the Joint Parliamentary Secretary, Ministry of Transport, Mr. J. HAY stated that the eastern section of the Maidstone bypass and a short length of the western section should be open for traffic by Whitsun. The rest of the western section would not be completed until the autumn owing to unforeseen difficulties with the foundations of the new Medway bridge.

Britannic Order Debated

An adjournment debate in the House of Commons of rather longer duration than usual was concerned with the Government decision to order 10 Short Britannic transport aircraft for the Royal Air Force. On one side it was argued that the aircraft would be too late and too slow when it was delivered and on the other that a much larger order was needed if development costs were to be justified. If that were done, there would be more chance of obtaining civil orders. It was also alleged that the aircraft bore very little relation to the Britannia but, in his reply, the Parliamentary Secretary to the Ministry of Aviation said that quite a substantial part of the components was closely related to the Britannia and that extensive use could be made of only slightly modified jigs and tools.

THAMES TUNNEL FIND

Light on Construction

IN the course of the rehabilitation work now being carried out at Wapping Station, on the London Transport East London Line, an iron chain has been found round the circular shaft leading down to the platforms. This shaft is one of the two original access shafts of the Thames Tunnel—the first tunnel for public traffic ever to be driven beneath a river—built between 1825 and 1843 by Sir Marc Isambard Brunel. Both shafts, it will be recalled, were built with stairways for pedestrians, but the inclined approaches which were to have allowed wheeled traffic to use the tunnel were never built and it was never used by carriages or carts. Instead, after purchase by the East London Railway in 1865, trains started to run through it in 1869.

The shafts were sunk in an unusual manner. A cast iron ring was constructed on the surface of the ground and the brickwork of the cylinder to form the shaft was built up on it above ground to its full height of 42 ft. The ground inside the cast iron ring was then excavated and the brick cylinder descended in one piece under its own weight as the ground beneath it was cut away. The rate of descent is said to have been about 6 in. a day. The brickwork of the shaft at the Rotherhithe end of the tunnel (which, unlike Wapping, has not been incorporated into the present station) was completed in three weeks but there was less hurry at Wapping, where from start to finish it took a year to build and sink the shaft. The cylinders were 50 ft. in diameter and 42 ft. high and weighed perhaps 1,000 tons.

The sinking process must have placed considerable strains on the newly-completed brickwork, and contemporary accounts state that the cylinders were "rigidly braced" to help them withstand the stresses involved. It seems probable that the chain recently discovered was placed round the exterior of the brick cylinder, before the lowering process began, to strengthen it as it descended into the ground. There may well be similar chains round the shaft at other levels. The chain is of iron and is in reasonably good condition after its 120 years in the earth. It is made up of 6-in. links forged from 1½-in. diameter bar.

VERSATILE ONAZOTE

REMARKABLE versatility of Onazote as an insulating material is shown in a new booklet issued by Expanded Rubber Co., Limited, Croydon. Entitled *World Railway Insulation by Onazote*, the booklet is printed in 14 different languages, including Russian, Chinese and Serbo-Croat.

Onazote is an expanded ebonite with a non-intercommunicating cellular structure. Its resistance to water is so remarkable that it absorbs only 1.5 per cent by volume after six weeks' total immersion. Descriptions and illustrations are given in the booklet of the ways in which Onazote has been used all over the world. Rainfall and extremes of heat and cold bring special problems in different countries, and the resistance of Onazote to all deteriorating factors is claimed to make it the most efficient means of insulation for all types of railway vehicle.

Thames-Duple Coach Tested on Hilly Route

(Continued from page 7)

emergency door. A sliding door covered the forward entrance and a coach-type door beside the driver's seat served as a second emergency exit.

Interior furnishing of the Duple body can comprise a number of alternative materials for side and roof panels, with the lightweight coach-type seats equipped with foam-rubber shaped cushions, squabs and headrolls and covered in moquette with contrasting p.v.c. facings and piping. Lino is fitted

by the front axle. In addition, there was a crew of three aboard throughout the test. The test proper started on the Great Chertsey Road near Twickenham with acceleration and braking tests, when it was found that the coach could be accelerated from rest through the gears in low axle ratio (6.25 to 1) in an average time of 8.3 sec. to 20 m.p.h. and 17.5 sec. to 30 m.p.h. (The speedometer was found to be accurate at 30 m.p.h.

seat and light handling of the vehicle were approved, to the bus park near Croydon Airport. There a turning circle test showed actual performance to be 2 ft. better than the brochure figure of 65 ft. at the wheeltrack and that the wings swept a circle 66 ft. in diameter.

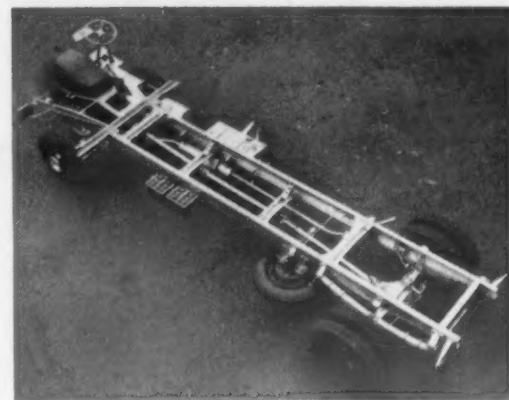
Value of Two-Speed Axle

The electrical axle-ratio change mechanism generally worked positively and quickly, unless there was a very wide mismatch between engine and road speeds through careless use of the accelerator, and split changes, that is simultaneous changes of ratio in axle and gearbox, could be made with confidence. This helped greatly in getting quickly back to normal speed after traffic checks, particularly on gradients. This was exemplified in continuing after the turning circle tests, when from a standing start the vehicle was accelerated up the long but not steep pull on Purley Way past the aerodrome to 40 m.p.h. in 45 sec. and the rise was breasted easily at that speed in low top gear.

Short of an overdrive gear in the main gearbox, which might perhaps be done at lower cost, the £100 extra paid for the two-speed axle is money well spent in the diesel-engined Thames intended for motorway or fast overseas operation. Apart from savings in fuel and general wear in running on the open road in the 4.5 to 1 high gear provided by the two-speed axle, there is the improved flexibility of performance already referred to and the advantage of higher top speed, where this can safely be used. At 4.5 to 1, the loaded coach could be worked up to about 70 m.p.h. and at this speed under open road conditions was stable and quiet; this compares with about 51 m.p.h. with the single-speed 6.167 to 1 axle and about 59 m.p.h. with the alternative 5.28 to 1 unit, use of which would affect gradient ability.

Good Climbing

With the two-speed unit, giving a low first-gear ratio rather lower than 40 to 1, the Thames got away easily on the 1 in 6 gradient of Bug Hill and although restarting was not checked on a steeper slope, the indications were that nothing likely to be encountered on normal roads, including the more remote tourist haunts, would prove embarrassing. Coolant temperature rise on a longish slow climb



A flat top to the frame and sturdy straightforward design are features of the Thames chassis



This general view of the Thames-Duple Yeoman 41-seater reveals dignity and comeliness typical of British coachwork craftsmanship

to the floor under the seats and sponge-backed rubber on gangway and entrance. Luggage accommodation comprises 95 cu. ft. in the rear locker and cantilevered full-length interior racks. Standard trim includes deep front and rear bumpers, with destination indicator and overriders incorporated in the front bumper, sun visor, concertina screen behind driver, two heavy-duty windscreen wipers, three driving mirrors, eight-day clock, first-aid outfit, fire extinguisher, tool locker under a front passenger seat, 10 interior lights, an entrance lamp and flashing direction indicators, while provision is made for interior heating and radio.

Tare weight of the test vehicle of 5 tons 4½ cwt. was brought up to a running weight of 8 tons 8 cwt. by the addition of equipment and bags of sand in each seat and in the boot. A weighbridge check showed that 3 tons of the total was borne

in a subsequent timed run over a measured quarter-mile. Average time taken to accelerate in top gear (low axle) from 10 to 20 m.p.h. was 12 sec. and from 10 to 30 m.p.h. 25.8 sec.

Emergency stops from 30 m.p.h. on dry level tarmac were made with equal efficiency, the average distance measured by our chalk-firing magazine being 42 ft., with all wheels marking fairly heavily and the offside rear locking in two of the stops. Don meter readings in these stops ranged from 70 to 75 per cent, while the handbrake alone, used heavily at about 20 m.p.h., produced Don meter readings around 30 per cent. Thereafter the test embraced a 12-mile run by way of Upper Richmond Road, Putney, Wandsworth, Trinity Road, Tooting Bec, Streatham, Thornton Heath and Purley Way, during which, with fairly heavy traffic, the good visibility, comfortable Chapman's driving

was checked travelling southwards on Caterham by-pass. Just over a mile was covered pulling hard, mostly in low top gear at 12 to 15 m.p.h., whereafter the independent thermometer showed a temperature of 160 deg. F. compared with that of around 145 deg. in normal running.

Good resistance to fade, even when the brakes are used unwisely, was evident in our usual check for this defect in a descent of Titsey Hill. The vehicle was allowed to coast out of gear for about half a mile down the slope, while speed was held on the footbrake to 20 m.p.h. or so. Still on the slope, speed was built up to about 30 m.p.h., when an emergency application produced a reading of 52 per cent on the Don meter and brought the coach to rest in a reasonable distance on a 1 in 8 gradient. Full recovery to previously recorded cold-brake efficiency was achieved after some two miles of running at normal speed, indicating good ventilation over the drums through the louvred chromium-plated wheel discs.

Fuel Economy

Notwithstanding its lively performance, both in traffic and on the open road, the Thames diesel coach appears likely not to disappoint its operators in the matter of fuel economy. Our two checks covered consumption over our standard 15-mile out-and-back route between Limpsfield Common and Riverhead on A25, running on a graduated test tank, and overall consumption for the whole of the day's running. The A25 route, which undulates and passes through the villages of Westerham, Brasted, Sundridge and Bessels Green, is by no means an open main road and on the day of the test carried fairly heavy traffic that hindered the Thames on a number of occasions and caused three complete halts. Nevertheless, the result worked out at 17.04 m.p.g. at an average speed of 29 m.p.h., indicating that a return of around 20 m.p.g. from operation in more open conditions is not over-optimistic.

At the other end of the scale, average consumption for the total distance covered in the test of 87 miles proved to be 12.8 m.p.g. This mileage included some 20 miles in the quite heavy traffic of south-west London suburbia and a good proportion of stop-start and low-gear full-throttle driving involved in our many tests. The result is probably a reliable guide to what might be expected of the vehicle operated at similar weight as a bus in feeder or rural service.

The Thames passenger chassis is a sturdy straightforward design using well-proved running units in volume production and there are many roles in coach touring and marginal bus operation that it is well equipped to fill. Its cost with the diesel engine of £1,175 (£1,040 petrol) represents outstanding value, while its maintenance in optimum condition should prove equally favourable by virtue of the acknowledged excellence of the universal Ford service.

ELECTRONICS INDUSTRY COUNCIL

New Body Formed in London

FORMATION of an Electronics Industry Council has been announced in London by the Electronic Engineering Association, which with the Radio and Electronic Component Manufacturers Federation and a number of other bodies has been discussing this for some time. The new council will be concerned with electronic instruments, sound and television transmitters, radio communication equipment, radar and radio navigational aids, computers, industrial electronic control equipment, industrial television and the electronic components used therein.

Its constitution will provide for the adherence of associations or federations of manufacturers concerned wholly or partly in the manufacture in the United Kingdom of electronic components, apparatus and equipment, except those used in the broadcast radio and television receiving industry and for public telephone services. Objects are (a) to promote and further the well-being of the industry in the United Kingdom; (b) to provide a channel for communication with the Government; and (c) to co-operate with other industrial, commercial and mercantile bodies in the United Kingdom and abroad. Its main function will be to deal with matters of concern to the whole industry while its constituent bodies remain autonomous in their own fields of activity.

Expanding Exports

The gross output of the industry with which the council will be concerned is valued at about £200 million annually and is growing quickly. The exports for this section of the industry, also expanding rapidly, in 1959 were worth approximately £50 million. One of the first tasks of the council will be to co-ordinate statistics.

Mr. L. T. Hinton, chairman of the Electronic Engineering Association, said: "With the tremendous expansion of the industry, covering so many industrial fields, some such body as this had to be formed. The new council, being in the capital goods field, is complementary to the Radio Industry Council, which for more than a year now has been dealing only with the associations whose members make broadcasting receivers, or the components and valves for them."

The offices of the Electronics Industry Council are at 11 Green Street, London, W.1.

The International Synthetic Rubber Co., Limited, has started to expand the annual capacity of its Hythe plant from 70,000 to 90,000 tons, after starting bulk production only in 1958.



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A MOTORISED TROLLEYBUS

Ingenious Modification of Hastings Guy

THE veteran Guy trolleybus of the former Hastings Tramways Company, a 1928 six-wheeled open-top vehicle with Dodson body, which was operated by Maidstone and District Motor Services, Limited, until its trolleybus services in Hastings were discontinued last year, will be running in the town again this summer—powered by a diesel engine. It was in 1952 that the bus, then long out of use, was restored to its original condition, and the occasion of the Coronation the following year provided an opportunity for it to be brought back into service as a contribution towards the town's festivities. Repainted in its old livery, it was appropriately decorated, illuminated at night with coloured lights, and operated between Fishmarket and the Bathing Pool at West St. Leonards, providing visitors and residents with a pleasant and unusual trip along the seafront. So popular did it become that it was in service each subsequent summer except for 1959, when, on June 1, it made its final journey in its original form on the ceremonial last run of Hastings trolleybuses.

Appreciating the regard in which this veteran was held by Hastings people, M. and D. was reluctant to dispose of it, and consideration was therefore given to ways and means of utilising it again. At first it was thought it might be possible to convert it to a petrol-electric vehicle, but this proved impracticable and an answer was found in the flat and compact Rootes opposed piston diesel engine. As far as is known, this is the only instance of one of these two-stroke engines being utilised in a double-deck vehicle.

Location of Diesel Engine

Even with this engine some difficulty was experienced in finding a position where it could be fitted without undue alterations to chassis or bodywork, but it was eventually located between the chassis frame with a portion extending to the rear of the cab, partly under the transverse seat which is fixed to the bulkhead. A standard clutch and gearbox and a modified front propeller shaft were fitted to take the drive to the twin rear axles, which, with their differentials, are those which were used when the vehicle was a trolleybus. The original front axle, steering gear and braking system are also retained.

Another problem which had to be overcome was the supply of electricity for the exterior illuminations. When it was a trolleybus there was, of course, unlimited current available and more than 500 bulbs were used, but it was obvious that no similar supply could be provided in a motorbus short of the installation of a special generating set. This was impracticable owing to space and noise considerations. After various alternatives had been considered it was eventually found that effective illumination could be obtained by the use of 24-volt 6-watt coloured bulbs, of which there are nearly

400 round the outside of the bus, and the current supply for these could be adequately met by two 55-amp. dynamos (the largest possible in the space available). The dynamos were fixed forward of the engine, one on each side, and a V-belt drive obtained from an extension of the main engine shaft. Two sets of 24-volt batteries for use in conjunction with this supply were installed, one on each side of the chassis. A standard 24-volt 25-amp. dynamo and battery supply current for the interior and road lighting and starting.

The additional load imposed by the dynamos appears to be well within the capacity of the engine, and test runs have proved most successful. The veteran in its new form has excellent running qualities and, with a special silencer and well-insulated engine covering, it is very quiet in operation. The conversion has, moreover, been effected without loss of any of the original 57 seats. All being well, this

31-year-old vehicle should have many useful years of service ahead of it, along the seafront of Hastings and St. Leonards. The company is, moreover, to be commended for its enterprise in preserving in useful form a vehicle which is generally agreed to be unique.

RADIO CONTROL

(Continued from page 3)

intervene. Besides the pure traffic control purpose the radio set is used to report faults on vehicles, tramtrack switches and the like. As the repair cars are equipped with radio sets, they can quickly be directed to the place or the vehicle where they are required.

Benefits to Passengers

The radio also brings about an essentially improved service for the travellers. Passengers can be informed about irregularities in traffic as they occur and can be asked to take other routes than the normal, if required. Further, the radio has been used many times in order to recover property lost in the trams and buses; many ladies' handbags have in this way been restored to their owners without the delays of the usual procedure.

Although there are limitations to the area which can be covered conveniently by this method the benefits in Göteborg were thus summed up by Mr. Camp in a contribution to a discussion at the U.I.T.P. meeting in Paris. "I can say that radio means an essential reduction of cost for the control of traffic," he remarked; "it gives an excellent oversight of the traffic situation, and offers the possibility of rapid intervention in case of disturbances, resulting in vitally improved regularity. Besides, it gives in many ways service previously unknown to both passengers and staff."

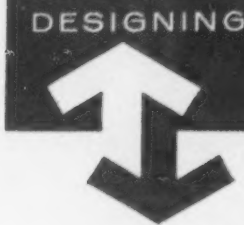
B.T.C. TRAFFIC RECEIPTS: PERIOD [NO. 4—1960

	Four weeks to				Aggregate for sixteen weeks to		
	Apr. 24 1960	Apr. 19 1959	+ or -		Apr. 24 1960	Apr. 19 1959	+ or -
	(£ thousands)				(£ thousands)		
PASSENGERS							
British Railways	11,455	10,556	+ 899		38,808	36,063	+ 2,745
London Transport	4,217	4,105	+ 112		16,867	16,036	+ 831
Road passenger services	1,905	1,818	+ 87		7,762	7,328	+ 434
Railways	4,392	4,317	+ 75		16,715	16,335	+ 380
Provincial and Scottish Buses	451	440	+ 11		1,075	1,121	- 46
Ships							
Total Passengers	22,420	21,236	+ 1,184		81,227	76,883	+ 4,344
FREIGHT, PARCELS AND MAILS							
British Railways							
*Merchandise and livestock	7,645	7,288	+ 357		31,420	30,365	+ 1,055
*Minerals	3,662	3,205	+ 457		15,395	13,840	+ 1,555
*Coal and coke	7,869	8,046	- 177		36,673	37,957	- 1,284
*Parcels, etc., by coaching train	4,142	4,083	+ 59		16,301	16,063	+ 238
*Total Freight British Railways	23,318	22,622	+ 696		99,789	98,225	+ 1,564
Others	4,223	4,017	+ 206		16,740	16,058	+ 682
Total Freight, Parcels and Mails	27,541	26,639	+ 902		116,529	114,283	+ 2,246
Aggregate	49,961	47,875	+ 2,086		197,756	191,166	+ 6,590

*Includes receipts from collections and deliveries.
Comparisons are affected by increases in rates and charges which have occurred from time to time



A 71-seat Dennis Loline with front-entrance East Lancashire body is seen arriving at Mount Street Bus Station, Nottingham. One of the North Western fleet, it is on loan to Trent



AND MAKING TRACTION EQUIPMENT

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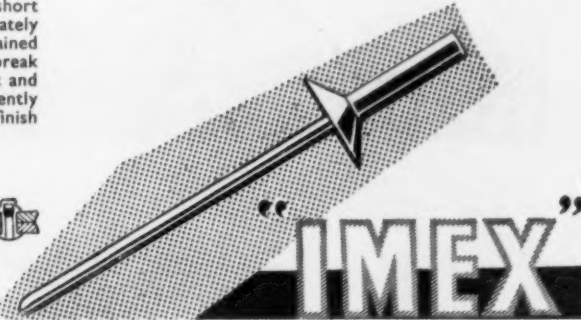
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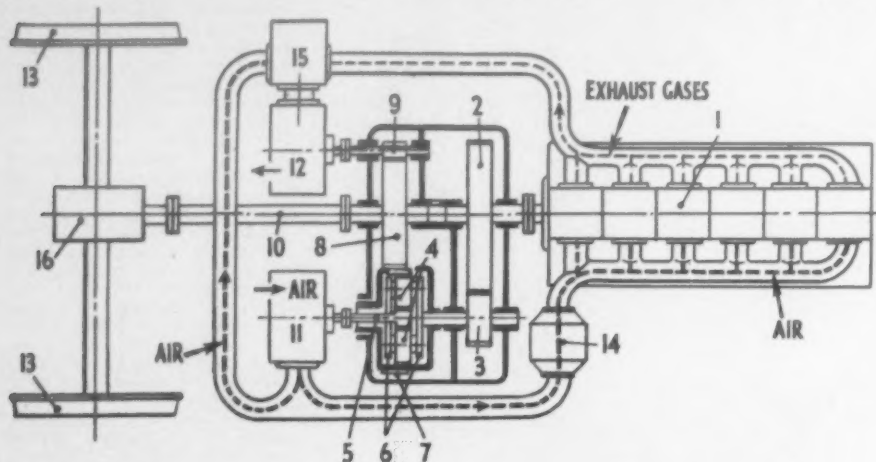
Swedish Diesel-Pneumatic Locomotive

(Continued from page 5)

is thus a differential mechanical drive both to the compressor (11), through planet carrier (6), planet pinions and sun wheel (5), and to the main propeller shaft (10), through planet carrier, planet pinions, crown wheel and gear wheel (8). Part of the air from the compressor, at a maximum pressure of about 34 p.s.i., is taken through an inter-cooler (14) to the engine air manifold for pressure charging and part is taken through a combustion chamber (15), where it mixes with the exhaust gas from the diesel engine and is expanded through the power turbine (12), which is directly connected to the main propeller shaft through a reduction gear (9 and 8). Additional fuel can be burned in the combustion chamber to augment the output of the diesel engine when required. The centrifugal turbine and compressor are the two halves

range in each gear and about 40 per cent at the top speed in each gear, which in the present locomotive for S.J. is about 22 m.p.h. in first, 40 m.p.h. in second and 75 m.p.h. in third gear.

A manual control to override automatic gear-changing is incorporated and this permits the driver to hold a low gear for dynamic braking, to start away in second or third gear when conditions are favourable or to hold a higher gear when driving a lightweight train at low speeds, thus improving economy. There is also an automatic down-change inhibitor when automatic drive is selected, which permits coasting in third gear right down to the halt, downward changes into the speed-appropriate lower gear only occurring as the engine is notched up. The power-boosting afterburning is normally not in operation, but is brought in by



Schematic arrangement of the Motala-Geislinger power-transmission system. 1 diesel engine, 2 and 3 step-up gear, 4 planet gears, 5 sun wheel, 6 planet carriers, 7 crown wheel, 8 and 9 reduction gear, 10 transmission shaft, 11 compressor, 12 turbine, 13 driving wheels, 14 charge air cooler, 15 combustion chamber and 16 axle drive

of a standard Brown Boveri turbocharger divided and mounted in separate casings.

With the engine running and train brakes on, it can be seen that the differential crown wheel is held stationary and the drive to the compressor is augmented through the planetary gear. In this condition at no load, the unit is self-governing at 700 crankshaft r.p.m. through back pressure of the turbine. When the brakes are released and the engine notched up, the initial starting effort is supplied about 60 per cent by the turbine and the remainder mechanically. With only a single mechanical step between the engine and differential, there would be only a gradual reduction of this proportion and the overall efficiency of the system has been improved by introducing a three-step gearbox, with automatic gear changing, so that in the present locomotive the proportion of work done by the turbine fluctuates between about 60 per cent at the high-torque end of the speed

of the driver by manipulation of a switch on the control panel when the extra power is required. The rating of 1,500 h.p. applied to the locomotive is calculated from the 1,200 h.p. of the diesel engine, 240 h.p. from afterburning and 60 h.p. reckoned to have been gained through the use of a low-loss transmission system. In fact, the manufacturer claims that the new locomotive disposes of the same effective power as contemporary diesel-electric or diesel-hydraulic engines rated at 1,550 h.p.

Low Axle Loading

The drive is taken from the main propeller shafts, which incorporate Layrub flexible and Hardy Spicer needle-roller-bearing couplings, through Durond wormdrive axle units to all eight wheels of the two two-axle bogies. An advantage of the new power-transmission system is its comparatively low weight and this has been fully exploited by Motala Verkstad by designing generally for low

overall weight and low axle loads. To this end, for the 1,500-h.p. locomotive, the company has developed a new lightweight bogie, a full description of which we hope to publish in a future issue.

Briefly, the new bogies incorporate fabricated frames of welded steel plate and make wide use of rubber in the laminated-spring suspension and bolster mountings; additionally, traction, braking and transverse loads are transmitted by four self-lubricating kingpins, which are located in fully enclosed housings, to each bogie, instead of the conventional single kingpin, reliance being placed on the high flexibility of the mountings for bogie articulation. These measures are said to have resulted in the virtual elimination of bogie maintenance. An unusual tyre profile, produced by machining a relief in the radius between tyre and flange, is designed to reduce rolling resistance and axle strain in curves.

Leading Particulars

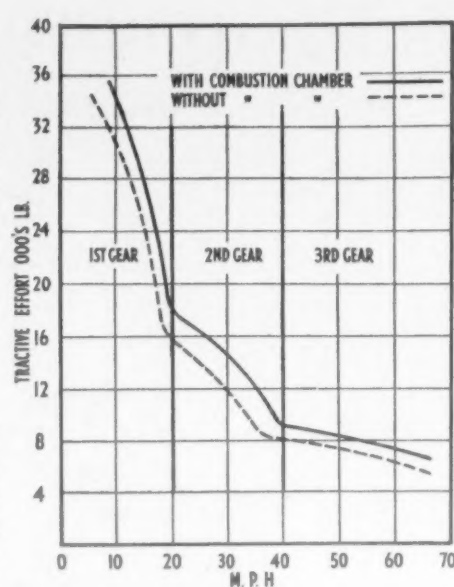
Weight savings achieved in the design are indicated by salient figures from the specification of the 1,500-h.p. BB locomotive. Built for the 4 ft. 8½ in. gauge and measuring 50 ft. 2 in. over buffers, it weighs approximately 59 tons, in working order, complete with train-heating diesel-generator and with full 450-gal. fuel tanks. The axle load is 15 tons. Bogie wheelbase is 9 ft. 2½ in. and distance between bogie centres is 26 ft. 11 in. Maximum tractive effort at about 5 m.p.h. is 36,000 lb.

An operational requirement in the locomotive for Swedish State Railways was accessibility of the engines from rail level and this has been achieved by making the engine casings narrower than the cab, so that opposite banks of cylinders and the crankcase doors can be reached by opening up side covers. The traction and train-heating engines are arranged at opposite ends of the locomotive, with the cab situated in between and extending above the general level of the machinery casings. The cab itself has driving positions at diagonally opposite corners, with duplicated seat, controls and essential instruments. Main controls comprise a forward-reverse selector with removable key and a drive (automatic gearchanging) selector incorporating first, second and third gear positions for manual override to the driver's right, an eight-notch fuel pump rack control incorporating deadman handle in the centre and locomotive and train air brake valves to the left. An independent handbrake is also fitted and controls for vacuum train brakes can be arranged.

Immediately ahead of each control desk is a panel carrying normal instruments relating to engine functioning and brake air and a speedometer, while a series of lights indicates which gear is engaged. Additional gauges and indicator lights in a central panel relate to afterburning for maximum power, which is brought into use when required by opening a fuel cock and closing a switch to initiate ignition in the combustion chamber. Boost power is shut down by closing the fuel cock.

Demonstration Run

In a demonstration run between Motala and Stockholm last month, arranged by A.B. Motala Verkstad in association with Swedish State Railways, in which we participated with a party of railway representatives from various European countries, we were given an opportunity of riding on the footplate. We were impressed by the simplicity of control and the extremely smooth starting

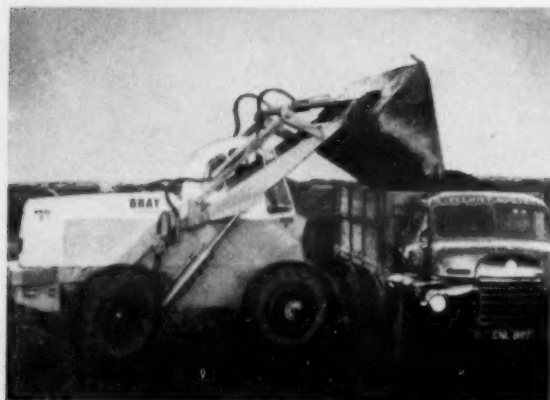
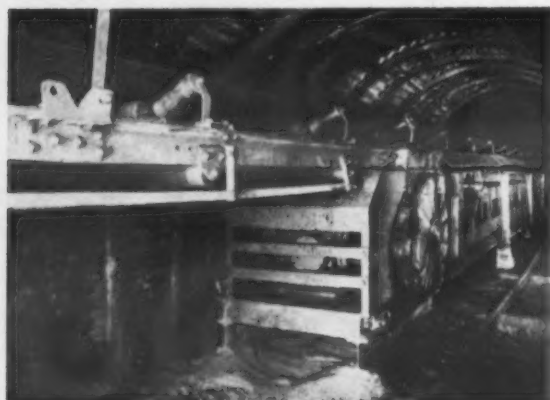


Curves showing tractive effort as a function of locomotive speed with and without additional fuel burning in combustion chamber

obtained. Acceleration under part or full rack was also smooth and with automatic drive engaged, changes of gear could be observed on the indicator lights but were otherwise barely perceptible. From a seat in the train they were undetected.

Lighting up the afterburner was successfully achieved by the driver at varying speeds and loads and this could be detected in the coaches, as on the locomotive, by the transient smell and colour of unburned fuel. Once alight, the odour disappeared but there remained a slight exhaust haze while the afterburner was working. The exhaust was commendably clear with only the diesel engine working and noise level in the locomotive was exceptionally low at all times. A noteworthy feature was the easy riding of the locomotive at all speeds up to the maximum of over 70 m.p.h. This was apparent particularly on the secondary track between Motala and Hallsberg, on which the new bogies gave a soft but controlled ride in sharp curves as well as on the straight.

The locomotive hauled a total train weight of 494 tons on the demonstration run, made up of normal passenger stock, a restaurant car and the 70-ton 1-D-1 1,200-h.p. prototype diesel-pneumatic locomotive. Inclusion of this engine in the train not only served to bring the total weight up to a realistic level, but also provided a practical answer to some earlier queries on the reversibility of the worm-drive axles, which type is common to both locomotives. The special train was scheduled to make the 167-mile run in 5 hr. 5 min., including 20 min. for reversal of the locomotive at Hallsberg. The 124-mile main-line section between Hallsberg and Stockholm was completed 20 min. inside the scheduled time, the whole run having been completed at an average speed, including four intermediate stops apart from Hallsberg, of 47 m.p.h.



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THE SILVER ARROW IN 1960

London to Paris in Six Hours

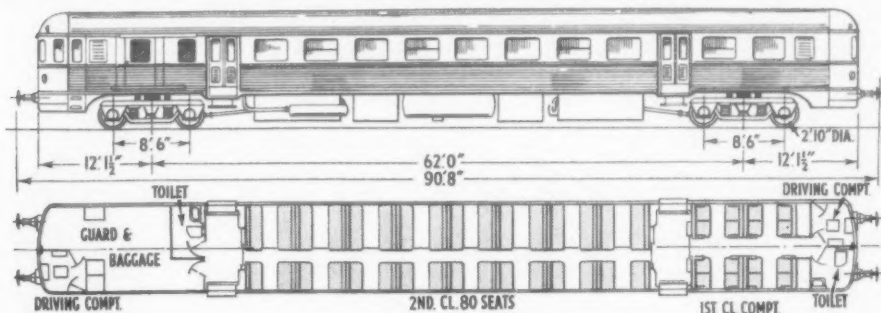
By a Special Correspondent

UNTIL such time as direct communication across the Channel is established by means of a bridge or tunnel, and airports can be located more centrally, there is little hope of any radical improvement over the existing services between London and Paris. Meanwhile, although the basic operating difficulties are virtually insuperable, the present position is by no means devoid of progress, and of the operators concerned probably none has shown more imagination and initiative to this purpose than Silver City Airways. It was on May 15, 1955, when this company inaugurated its first through passenger service, consisting of a coach link to Ferryfield Airport, a cross-Channel flight and a final coach trip to Paris. Despite its low cost

and 22 min. longer on the return journey, departing from the Gare du Nord at 14.21 hr. This is because it uses the normal boat-train service with a special stop put in at Etaples for the Silver Arrow service.

The Budd Railcar

The regular incorporation of this vehicle on the Silver Arrow service is certain to prove a very popular attraction. Quite recently we were given facilities to sample the Silver Arrow with the railcar in service, and its excellent performance and superb riding qualities confirmed that it is ideally suited for the job. Notwithstanding that it was hauling a trailer and made a stop of 3 min. at Amiens, the 141 miles from Etaples to Paris was covered in



General arrangement of the Budd railcar which works the Etaples-Paris sector of the Silver Arrow service

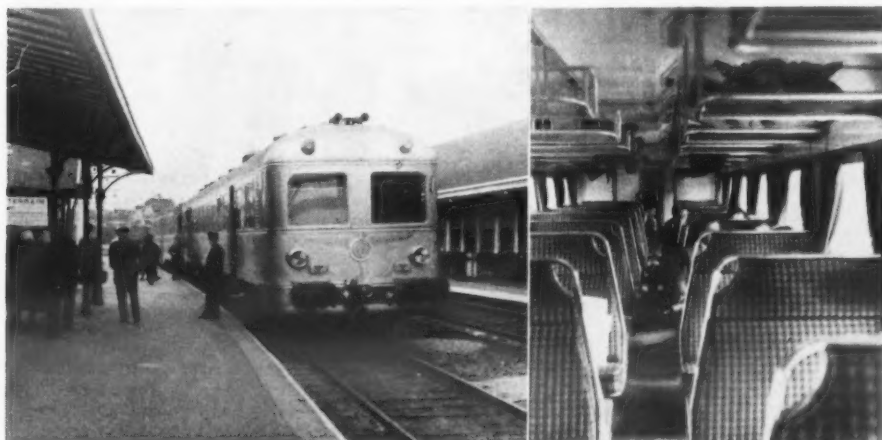
and developing traffic, this journey was too slow and tedious to satisfy the ambitions of the operators—Silver City and its French associate Air Transport, and in the following year arrangements were made for the Le Touquet-Paris sector to be covered by train. This practice continued each summer and whenever possible the Etaples-Paris rail journey was made in a special railcar. The link between London and Ferryfield was provided by East Kent coaches.

Then, in 1959, came an opportunity to accelerate further this facility while retaining the fares at a reasonable level. Of paramount importance, the large military aerodrome at Manston, near Ramsgate, became available for civil air operations, and secondly, in June, 1959, the Southern Region of British Railways completed the electrification of its Kent Coast line between London and Ramsgate via Chatham. A third factor was the continued willingness of the S.N.C.F. (French National Railways) to provide quick low-priced transport between Etaples and Paris. Thus the Silver Arrow

142 min., with such ease that it was hard to appreciate that the journey had been accomplished at an average speed of almost 60 m.p.h.

This railcar is unique in that it is the only one of its kind in France. Officially designated the X2051 it was built in France by the Etablissements Carrel Fouché under licence from the Budd Company of Philadelphia, U.S.A., the original design being modified to meet the requirements of the S.N.C.F. The purpose behind its introduction was to make a comparative study between French and American practice, and in particular the advantages and disadvantages of operating with horizontal underfloor motors. It is, in fact, powered by two General Motors horizontal six-cylinder 275-h.p. 1,800-r.p.m. two-stroke diesel engines developing 275 h.p. at 1,800 r.p.m., each driving a bogie through an Allison hydro-mechanical torque converter. It is fitted with disc brakes and a Rolokron anti-wheel-slip device. The maximum service speed is 87 m.p.h.

The body, which is 87 ft. 3 in. long, is in stainless steel and insulated by means of glass wool



The Budd railcar with trailer attached at Etaples; right, interior of the second-class saloon

rail-air-rail service came into operation in the second half of last year with a once-daily service to and from the French capital. Despite the more complicated procedure occasioned by the interpolation of a second short coach link between the railhead and the airport, the overall journey time was reduced to approximately six hours, and at an inclusive return fare of £8 19s. the service provided an ideal compromise between fast but comparatively expensive air travel and the slower surface routes.

Improved Service

Commencing on May 29, this existing service as briefly outlined, will be improved, and subsequently duplicated from June 25 to September 12 inclusive. The S.N.C.F. has agreed normally to run a special service for air passengers between Etaples and Paris, using a prototype Budd railcar. This vehicle, in conjunction with the Handley Page Hermes aircraft which came into service when the operation was transferred last year from Ferryfield to Manston and the new Southern Region electric trains provide a notably high standard of second-class travel throughout and effect a further overall saving in the journey time. Other attractive features of the service include the provision of couriers between Victoria and Etaples in each direction, reserved seating accommodation, and buffet facilities on Southern Region trains, and at Manston Airport. Passengers wishing to travel first class by rail may do so on payment of a supplement.

Leaving Victoria at 08.40 hr. by ordinary express service to Ramsgate, passengers alight at Margate at 10.20 and are taken by coach to Manston. The plane leaves for Le Touquet at 11.05 hr. and touches down at 11.25. Then follow the normal Customs formalities and a short coach journey to Etaples Station whence the railcar departs at 12.15 and arrives at Gare du Nord at 14.42 hr., having covered the 141 miles in 147 min. inclusive of a 1-min. stop at Amiens.

In the reverse direction the train leaves Paris at 8.42 hr. arriving at Etaples 11.05. The aircraft leaves Le Touquet at 11.55 hr. and the journey is completed by train from Margate, arriving at Victoria Station at 15.05 hr. The journey times are therefore 6 hr. 2 min. for the outward trip, and 6 hr. 23 min. for the return. The relief service which will operate from June 25 to September 12 inclusive, takes 40 min. longer on the outward journey, commencing at 14.40 hr. from Victoria;

bonded with bitumen emulsion. Air conditioning is not fitted, but adequate ventilation is assured by two motor-driven fans, static air extractors and half-drop windows on one side of the vehicle. Thermostatically controlled heating is by means of the engine-cooling water, one engine supplies the radiators along the sides at floor level, whilst the other supplies a heat exchange circuit warming air introduced from a ceiling duct. The vehicle, which weighs 46½ tons is designed to seat 96 passengers, 80 second class and 16 first class, the latter in a separate saloon. With a trailer attached a further 86 can be accommodated, bringing the total capacity of the train up to 182.

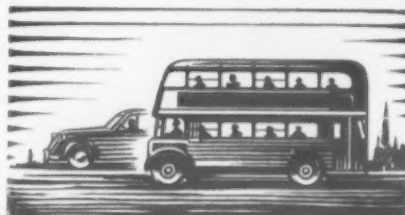
The railcar has a driving compartment at each end, a baggage compartment, two vestibules and two toilets. One of the latter is remarkable in that it is adjacent to the front end driving compartment and commands a fine view along the track; a novelty that one feels may well attract photographers and others who have rarely seen this sight before! In its principal dimensions the Budd railcar corresponds to the standard 600-h.p. railcars of the S.N.C.F., but by virtue of its underfloor engines it has more available space for passenger accommodation. This factor, combined with its quiet and smooth performance may eventually have some influence on the normal French practice, which is to have the engine above floor level.

Future Prospects

In considering how the Silver Arrow service might be further improved, attention is at once focused on the possibility of eliminating the rail-air-coach links which complicate the journey. Both at Manston and Le Touquet the railway is sufficiently near to require nothing more than a short spur to afford direct access, and in each case the land is free from obstructions. Whether or not the railways are prepared to take advantage of these fortuitous circumstances remains to be seen, and no doubt much will depend on whether the build-up of traffic is sufficiently encouraging. There can surely be little doubt that a direct rail-air-rail service would be immensely popular with many travellers and there is much to be said in this case for taking the initiative, since it would certainly give rail transport a permanent stake in the tremendous future of cross-Channel air services. The puzzling thing at the present is the failure of the Southern Region to include details of the facility in its timetables.

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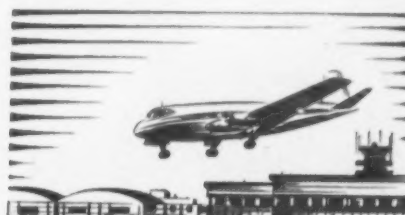
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DE LUXE NEW ZEALAND ROAD SERVICE

Special Leyland Worldmasters Used

EMPLOYING two special Leyland Worldmaster single-deck chassis with bodies built by the operator, Midland Motorways Services, Limited, Christchurch, New Zealand, a road service classed as "super-luxury" is now available seven days a week to travellers between Christchurch and Dunedin. The coaches are scheduled to cover the 230 miles each evening in opposite directions in 6 hr. 50 min., including a half-hour refreshment stop. For 100 miles between Christ-

intermediate stops and terminals, ensuring that required facilities are waiting.

No expense has been spared to provide passengers with maximum comfort. Although the coaches are said to be the longest ever built in New Zealand, they have large foam rubber seats trimmed with uncut moquette for only 32 passengers. Each one of the side windows is nearly 6 ft. long and the spacing of the seats at 37 in. centres is arranged so that the body pillars do not



Super-luxury is the adjective applied to this Midland Motorways coach on Leyland Worldmaster chassis, an interior feature of which is the immediately adjustable footrest seen on the right; two such vehicles operate a regular evening service between Christchurch and Dunedin in New Zealand



church and Timaru the going is flat but the remainder of the run is through undulating country, with two steep hills near Dunedin. A Midland Motorways spokesman said that the 150-b.h.p. diesel engine and the Pneumo-Cyclic semi-automatic gearbox of the Worldmaster made the fast schedule possible.

The chassis used is an exceptionally low-framed Worldmaster Model CRT.1 on which 33-ft. long bodies have been built by Midland Motorways at a total vehicle cost of about £10,000 each. The type is named Starliner. In order to facilitate close running schedules, in designing the body the operator moved a number of accessories, including fuel tanks, to provide luggage accommodation in accessible positions. Time is saved, too, by fitting a public address system so that passengers can be given information by the driver before arrival at a stop, and by providing two-way radio telephone communication between the coaches and the two

obstruct the view. Adjustable footrests for each seat provide comfort for tall or short passengers. An aircraft-type toilet is fitted at the rear.

Over 100 lights have been fitted to each coach, including those on the control panel, in luggage compartments and destination signs. In addition to the general interior lights, each seat has an individually-controlled reading lamp built into the underside of the parcel racks. There are also lights at foot level in the aisle.

A feature of the Starliner is a double floor, the space between providing ample luggage room. The floors have also been specially insulated to prevent noise from the engine reaching the saloon. The underside of the upper floor has a layer of soft-board, the lower floor having a layer of cork. Sheets of plastics foam are also fixed below floor level and between the panels. Saloon heating is from two units fitted under the seats, while there is a heater demister for the driver.

Snow and Ice Disposal

MULTI-PURPOSE EQUIPMENT

WIDE scope in the more northerly overseas markets is foreseen for what is claimed to be a completely new approach to snow removal problems, the Snow Locust, developed by Mobile Jet Dispersals, Limited, Newcastle upon Tyne. By applying the principle of controlled heat through primary and secondary sources, the manufacturer states that snow drifts up to 7 ft. deep and packed ice can be dispersed at operating speeds of up to 5 m.p.h. While the snow dispersing equipment can be mounted on virtually any chassis, the prototype tests have been satisfactorily completed with the equipment installed on a small four-wheel-drive utility vehicle, the ancillaries being operated from a countershaft driven from the rear power take-off. Ancillary equipment can be driven from an independent 5-h.p. engine if preferred.

Originally conceived eight years ago, the Snow Locust has been subjected to exhaustive develop-

ment tests, in the light of which many modifications have been introduced before the product was considered sufficiently developed for production plans to be finalised. It is protected by British patent and world patents are pending.

at the rear of the vehicle and operating from the countershaft feeds air through ducting and three flexible 6-in. dia. hoses to the top of the working head. Emitted from vents extending the width, and situated at the top of the working head, the air is sufficiently heated to remove the steam which would otherwise impair the operator's vision. Any tendency of the working head to contact the road when working on uneven surfaces is eliminated by the provision of two small castors fitted to the underside of the working head.

The application of concentrated heat to a snow-covered road would normally leave the surface saturated, and in freezing conditions, potentially dangerous. In the Snow Locust provision has been made for such conditions by trailing a squeegee and rotary brush behind the vehicle, thus directing the water into roadside drains or dykes. It is stated that the road surface after this treatment is left in a condition of "dry dampness," largely unaffected by frost.

In exceptionally severe frost conditions, facilities for attaching a sand, salt or grit spreader are provided. The rotary brush is mounted to a tubular steel frame which can be isolated from road contact by elevation from a centrally mounted hydraulic ram. The brush drive is taken through a universal coupling (to permit elevation), to the power take-off shaft or independent engine. The hydraulic pump for elevation of working head and rotary brush is vee-belt driven from the countershaft, controls being situated between seats in the driver's cab.

It is claimed that a two-man crew only is required to operate the Snow Locust. The manufacturing company operates a free tuition service on the operation and maintenance of the machine for nominated employees of customers. Initially, two types are being produced for operation respectively in town and country. The former will effectively dispose of snowfalls up to 3 ft. deep and the latter having the extra capacity to deal with drifts up to 7 ft. deep and equipped with heated crew cab. Either may be released for other duties, such as towing, sweeping, and so on, in summer by removing the working head.

Operating costs, including fuel and labour, are estimated at 35s. per hr. for the town model and 45s. for the larger-capacity country model. This is stated to be a 50 per cent saving on traditional methods of snow dispersal. The Snow Locust is said to be capable of cutting a 9-ft. wide path through a 6-in. snowfall at a speed of 4 m.p.h. Tested on various types of road surface, it is claimed that no damage to the surface itself can result, as the heat generated by the working head is carried away by the melted snow or ice.

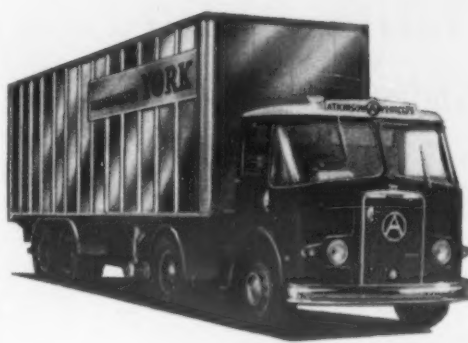
The Snow Locust equipment mounted on a Land-Rover



Mounted to and pivoting from brackets welded directly on to the forward chassis frame, a working head directs heat forward and downward on to the snow or ice surface, through a variable number of equidistant Swirlamiser oil burners. Each burner has a variable heat output of from 40,000 to 120,000 B.T.U.s per hr. at a temperature of 1,200 deg. F. A cowl is fitted to each burner to obtain heat concentration and eliminate risk of blowback during windy operating conditions.

The fuel used is 35-sec. gas oil, which is pumped from a tank mounted at the rear of the vehicle. Air for combustion is fed from a compressor operating at a preset pressure feeding air through flexible hose to the front working head. The compressor is vee-rope driven from the countershaft. Lift and tilt of the working head, providing a suitable relationship with the snow surface, is provided through a single hydraulic ram.

In addition to the primary heating source provided by the oil burners, a secondary cycle is supplied, the purpose of which is to condense and de-steam vapour arising from the application of direct heat to the snow-ice surface. A fan mounted

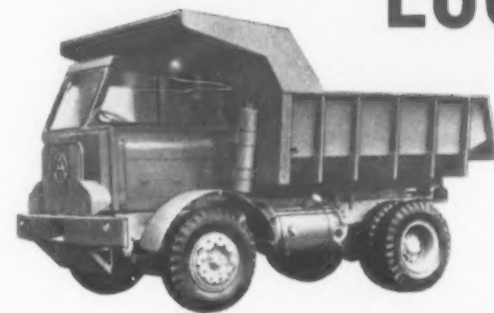


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LEADERSHIP IN LUBRICATION

NEW KINGSFERRY BRIDGE

Elimination of Transport Hazards (Cont.) *

THE machinery of the new Kingsferry Bridge, which was formally opened by H.R.H. the Duchess of Kent on April 20—it had actually been used by road traffic since February 29 and by trains from April 10—is housed in the piers at each end of the lifting span with a synchronous tie between the motors to ensure that the span remains level. The machinery chambers at each main pier rest upon two concrete cylinders which are founded in the London Clay at approximately 60 ft. below high water level. These cylinders are hollow, of 32 ft. external diameter with reinforced concrete walls 5 ft. 6 in. thick. Between two of these piers a service tunnel of 8 ft. 6 in. diameter has been driven under the navigation channel to accommodate an 18-in. water main and a 12-in. gas main, together with sundry British Transport Commission cables. On each side of the lifting span the approaches consist of three side spans of approximately 80 ft. each, supported on piers, each of which are founded in five reinforced concrete piles 4 ft. in diameter and sunk to a depth of about 80 ft. below high-water level.

Approaches

The road and rail approach embankments and main abutments are founded on difficult ground. The whole area is marshland with clay to a depth of 25 ft., and a top layer that is too soft to permit more than a 14-ft. embankment without special measures. Because of these conditions the main abutments to the bridge have been constructed in the form of hollow boxes resting on 18-in. diameter concrete piles driven to a depth of 50 to 60 ft. The former road approaches across the marsh from both the island and the mainland were too narrow and tortuous for present-day traffic, and they have now been superseded by a new road extending from Iwade on the mainland to Cowstead Corner on the island, a total distance of nearly three miles.

* Previous portion appeared April 23.

On the island approach the embankment rises to almost 30 ft. above the marsh in order to cross the railway, and an anticipated settlement in the subsoil of nearly 4 ft. has been allowed for. Similarly where the main drainage dyke passes under the embankment in a 5-ft. diameter culvert, flexible joints have been used to allow for future settlements of up to 3 ft. Most of the road crosses the marsh on an embankment made up from four parts of chalk and one part of ash spread in 9-in. layers and compacted with smooth wheeled rollers. Altogether about 214,300 cu. yd. of material were used, and all of it had to be brought to the site from other sources. The entire work was completed on schedule in 27 months despite the considerable unforeseen difficulties mainly arising from the poor subsoil conditions.

Disbursement

The estimated cost of the whole scheme is £1,380,810 after deducting the £122,500 contribution from the British Transport Commission, plus £50,000 from the Bowater Paper Organisation, and further contributions from the South Eastern Gas Board and the Sheppey Water Board; 75 per cent of the balance will be borne by the Minister of Transport, and 25 per cent by the county council.

For the bridge project the sub-contractors were Dorman Long (Bridge and Engineering), Limited, and Sir William Arrol and Co., Limited. The approach roads have been built by the Kent County Council through its country surveyor, Mr. H. Bowdler, M.I.C.E., M.I.Mun.E., and the staff of the roads department.

Opening Ceremony

After pressing a button which operated the bridge, Her Royal Highness commented upon the unusual design and added "even the largest of ships will have difficulty in putting this one out of action." It completed a further stage in the modernisation and extension of the road and rail



An aerial view of the new Kingsferry Bridge looking towards the south-east. John Howard and Co., Limited, the main contractor, is dismantling the old bridge.

network of Kent, for these improvements would indeed benefit the whole county. The new railway layout and approach roads would make Sheppey far more attractive both to visitors and industrialists.

Subsequently the Duchess unveiled a commemorative plaque on the bridge bearing the emblems of the Kent County Council and the British Transport Commission, together with the names of the eight concerns involved in its construction.

The Belfast depot of Pritchett and Gold and E.P.S. Co., Limited (maker of Dagenite batteries), moved on February 1 to 9a Albert Street, Belfast (tel. Belfast 26398 as before). The new depot provides improved facilities for customers and staff.

MORE TONNAGE OXYGEN

B.O.G. Plan for Further 1,500 Tons Daily

RECENT expansion plans announced by the steel industry have placed an even greater emphasis on the importance of tonnage oxygen to steelworks in the United Kingdom. Following negotiations and discussions with steel makers, arrangements have been made by British Oxygen Gases, Limited, to increase its tonnage oxygen supply investments in several steel-making districts and to erect further tonnage oxygen plants at new steelworks sites.

Additional plants providing for the increased requirements of seven individual steelworks will produce 1,500 tons of gaseous oxygen a day—more than doubling the present tonnage supply to the industry. Among present-day leading products from steelworks is the continuously rolled strip for vehicle and consumer-goods industries. Stringent quality control and an increasing demand for these flat products has necessitated the use of new production techniques. The demand for metallurgical oxygen has risen to an unprecedented level and new methods in oxygen production and distribution have been developed to meet greatly increased requirements. British Oxygen Engineering, Limited, will design and build all the new plants, which will then be operated and maintained by British Oxygen Gases.

Service to Steel Makers

Among the expanding steel makers included in the present plan are the Steel Company of Wales, which will soon have a supply increased from 300 to 500 tons a day from three tonnage oxygen systems at the Margam site; the Consett Iron Co., Limited, in Durham, previously drawing its oxygen requirements from a 100-ton a day supply, and now to consume up to an additional 200 tons a day from two new installations; the South Durham Steel and Iron Company, which will make use of a new tonnage oxygen plant at West Hartlepool with a production capacity of 100 tons a day; and Colvilles, Limited, which will have the oxygen requirements of its new steel sheet mill at Ravenscraig in Scotland met by a 200-ton a day plant at Motherwell. A second plant of the same capacity will enable the application of oxygen to be further extended to Colville's melting shops at Dalzell and the Lanarkshire works. At Scunthorpe, Lincs, an existing 200-ton a day plant is to be augmented by a further installation of similar capacity to satisfy the combined requirements of steelworks in the district, including Richard Thomas and Baldwins' Redbourn works and the Appleby-Frodingham Steel Company. At Middlesbrough a 200-ton a day tonnage system pipes supplies to several local steel makers. Two new tonnage plants having a total production capacity of 400 tons of oxygen a day will supply the Spencer works at Newport, of Richard Thomas and Baldwins, Limited, when the plant is commissioned in the autumn of 1961.

SEVERN TUNNEL PUMPING STATION

Electrification by Brush

A CONTRACT worth more than £100,000 has been placed by British Railways Western Region with the Brush Electrical Engineering Co., Limited, a member of the Hawker Siddeley Group, for the electrification of the Severn Tunnel pumping station at Sudbrook, near Chepstow. Natural seepage from an underground spring and drainage water from the Severn Tunnel has been disposed of by the Sudbrook pumping station since 1870. Much of the original Cornish beam steam engine driven pumping plant has been in operation until the present day. In the interests of engineering historical interest, the new modernisation plan makes special provision for the preservation and display of the more outstanding items of the old plant.

The equipment to be supplied includes a high-tension substation containing a 23-panel 3.3kV 75mVA switchboard incorporating solenoid-operated circuit breakers. A 17-panel control board will provide overall operational supervision of the pumps, fans, auxiliary transporters and alternators. The contract also contains a requirement for a special lighting and heating system and a comprehensive cabling arrangement.

Standby Power

Although power for this installation will normally be taken from the public supply, two diesel generating sets will also be installed as standby plant for emergency uses. These will be equipped for automatic starting, with both remote and local indication, and each set will be capable of accepting full load within 15 sec. The generating sets will comprise a 16-cylinder vee-form totally enclosed four-stroke pressure-charged and intercooled diesel engine manufactured by Mirreles, Bickerton and Day, Limited, also a member of the Hawker Siddeley Group. Each engine will develop 1,881 b.h.p. at 750 r.p.m. and drive a 3.3-kV 50-cycle Brush alternator.

All auxiliaries necessary for the complete station, including air compressors, overhead crane, bulk fuel storage and transfer equipment, are covered by the contract.

PRICE REDUCTION

David Brown Marine Engines

RECENT reorganisation by David Brown Construction Equipment, Limited, of manufacturing arrangements has enabled the company, now based at Meltham, near Huddersfield, Yorkshire, to reduce the prices of David Brown four- and six-cylinder marine diesel engines by amounts ranging from £50 to £100. The MD430 four-cylinder engine is now priced at £400 (previous price £450); the MD6R six-cylinder raw-water-cooled unit sells at £475 (formerly £560); and the MD6F six-cylinder fresh-water-cooled model is listed at £525 (old price £625).

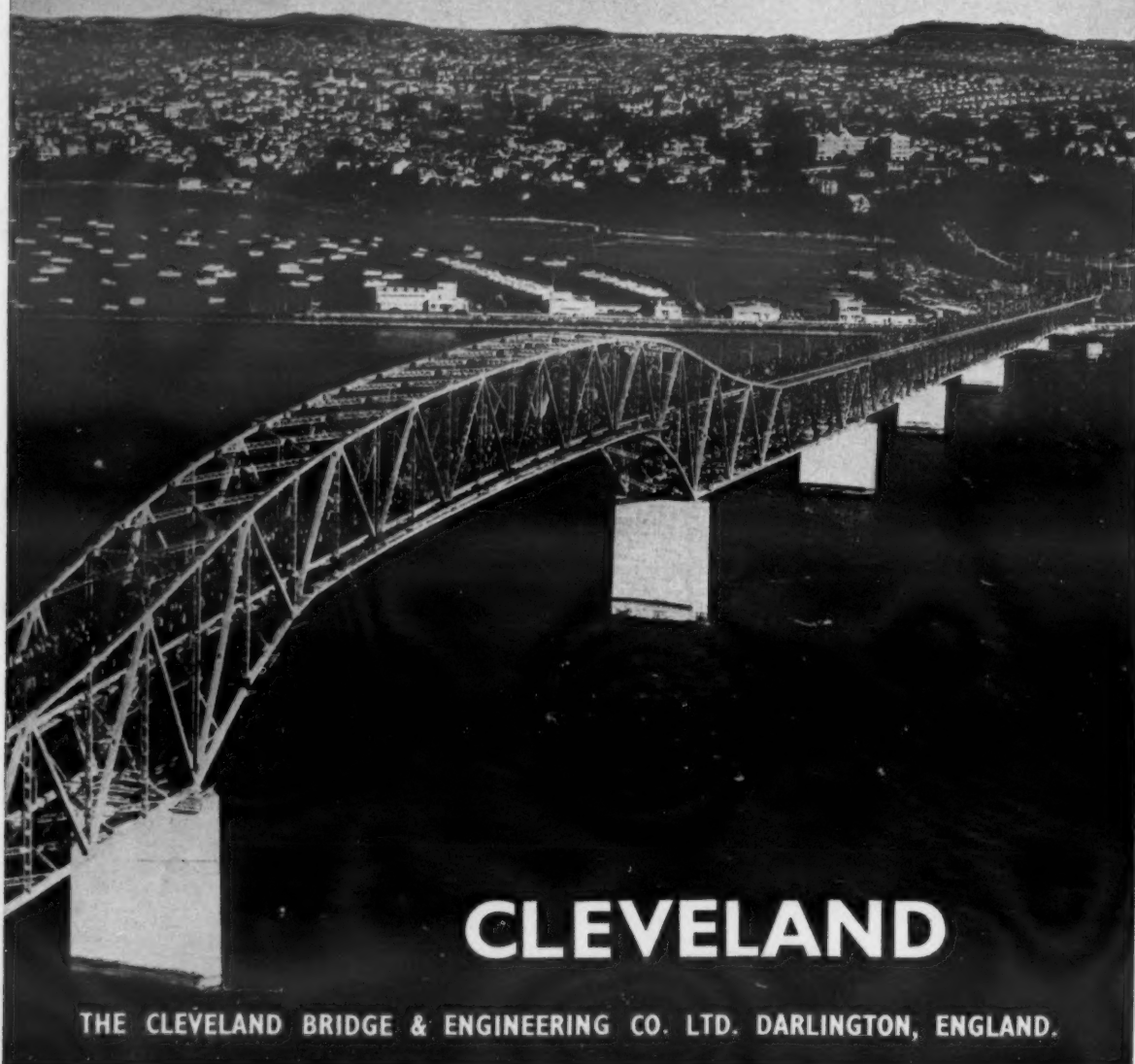
In each case, the engine is supplied complete with direct-drive forward-reverse gearbox. Alternatively, 2 to 1 or 3 to 1 reduction boxes, either of standard or handed rotation, are available at extra cost. The worldwide distributor of David Brown marine engines is Arthur Bray, Limited, Poole, Dorset.

A GRACEFUL NEW BRIDGE OVER AUCKLAND HARBOUR

Built for the Auckland Harbour Bridge Authority this graceful new bridge has a total length of 3,348 ft. The central span over the navigation channel is 800 ft. long and has a high water clearance of 142 ft. The structural steelwork totals 6,070 tons and was fabricated in England from British Steel.

Consulting Engineers: Freeman, Fox & Partners of London.

The contractors were The Cleveland Bridge & Engineering Co. Ltd., and Dorman Long (Bridge & Engineering) Limited in partnership.



CLEVELAND

THE CLEVELAND BRIDGE & ENGINEERING CO. LTD. DARLINGTON, ENGLAND.

THE DEVELOPMENT OF THE TROLLEYBUS

2—Early Ventures in Britain*

FEW SCHEMES REACH FRUITION

THE idea behind installation of a trackless trolley system in early days was often to provide a feeder to an existing tramway or railway system. In some cases the object was to provide a passenger service at low capital cost and thus discover whether the expense of laying a tramway would be justified.

Many problems arose in different localities such as the legal position of trackless trolleys. Were they light railways without rails or motor vehicles with wires? In many cases complaints were raised about damage to the roads when in fact the state of the roads often damaged the vehicles through the joltings and shakings caused by the uneven surface and the clouds of penetrating dust which rose as they passed. The merits of the trolleybus compared with a motor bus were summed up by one writer in 1908 as "having no smell, no noise, no jerking, no dropping of oil in the streets and no suffocating vapour."

Typical Early System

A typical system in Germany at this period was that operated by Mülhausen Common Council from the town centre to the Zoological Gardens, a distance of about one mile. The Max Schiemann single-pole system was used and the double line of overhead equipment at 500 volts was set up early in 1908. Trials were made in May of that year and the experiments were very successful. The cars were fitted with a forked trolley arm and front-wheel drive, and were capable of 9 ft. 6 in. deviation on either side of the running wires. The small front wheels were fitted with rubber tyres and the larger rear wheels with steel tyres. They were

because the system was as yet untried in this country. The Board of Trade seemed to take the view that its officers could not approve a hybrid that did not fit the vehicle into any defined class.

British Demonstration

The answer to this setback was soon forthcoming. The Railless Electric Traction Company gave a demonstration of the first trolleybus built in this country at the Metropolitan Electric Tramways Company's Hendon depot on September 25, 1909, for the benefit of transport managers. A further demonstration was given on September 29 at the same place. At that time the M.E.T. was a British Electric Traction company. The vehicle was equipped with two 25-h.p. British Thomson-Houston motors, while the trolley equipment and overhead wires were supplied by Brecknell, Munro and Rogers, Limited. There were 22 seats inside and two additional seats on the rear platform. The body was built by Milnes and Voss, Limited.

The route was in the shape of a U with a turning place at each end; a gradient of 1 in 9 was included. The vehicle was repeatedly manoeuvred at full speed within limits corresponding to a road 34 ft. wide, without dewatering. The road surface was not macadamised, and following heavy rain contained ruts about a foot deep in places at the time of the tests. A great deal of concern was felt about the danger of inadequate earthing arrangements, and to safeguard against this hazard it was proposed that the car should operate on a three-wire system if required. Only two wires were used for the tests and as these gave no trouble this plan was

TROLLEYBUS SYSTEMS OF THE PAST

Last days of operation of British trolleybus systems which have been wholly abandoned

1914 May 13	Dundee Corporation	1951 June 30	Birmingham Corporation
1915 March	Rhondda Tramways	1952 November 8	Llanelli and District†
1919 October 7	Stockport Corporation	1953 April 2	Hartlepool Corporation and West Hartlepool Corporation
1925 July	Aberdare U.D.C.	1953 April 25	Notts and Derbys Traction Company
1926 May 5	Keighley Corporation (first system)	1954 October 28	Southend-on-Sea Corporation
1926 October 24	Halifax Corporation	1956 March 25	Bolton Corporation
1927 September 5	Oldham Corporation	1957 January 31	Pontypridd U.D.C.
1928 July 26	Leeds Corporation	1957 August 1	Darlington Corporation
1929 December 31	York Corporation (first system)	1957 June 30	St. Helen's Corporation
1930 December 31*	Ramsbottom U.D.C.	1958 August 31	South Lancashire Transport Company
1931 October 31	Wigan Corporation	1959 May 31‡	Maidstone and District Motor Services, Limited (formerly Hastings Tramways Company)
1932 August 31	Keighley Corporation (second system)		
1935 January 6	York Corporation (second system)		
1938 March 24	Chesterfield Corporation		

* For a long period a token service only had been operated.

† Llanelli and District Electric Supply Co., Limited, became vested in South Wales Electricity Board, which transferred trolleybuses to South Wales Transport Co., Limited, on March 22, 1952.

‡ End of public service; ceremonial last run on June 1.

designed with a centre entrance, and seated 13 passengers each, some space being forfeited by providing the driver with a separate cab. Four of these cars were eventually in use on this line.

The inspecting officials were called from Strassburg to approve the layout of the undertaking. Unfortunately, on the demonstration run the car got out of control down the 1 in 12 incline and only the skill of the driver in steering avoided a serious accident. The officials insisted that better brakes should be fitted before the line was opened to the public. This was done, but legal arguments then arose about the liability to conform to railway regulations. The line was at last opened in October, 1908. Other systems were opened at Drammen in Norway and Pressburg in Hungary, besides numerous short lines in Austria, Germany and Italy before the idea took root in the British Isles.

Dundee Enterprise

In June, 1908, a deputation from Dundee Town Council visited Germany to see the railless systems. They went to Langenfeld near Cologne, where the line to Monheim was about to become a light railway, Ahrweiler on the Rhine, and Mülhausen in Alsace. The reports they brought back were sufficient to convince the council that the idea was a good one, and it was decided to advise the Board of Trade of its intention to adopt the trackless trolley system in the Clepington Road. Several other towns such as Manchester, Sheffield and Northampton decided to follow Dundee's example and to send deputations to the Continent.

At the end of 1908 powers to run trackless trolleys were being sought in the 1909 Parliamentary Session by Bradford, Gateshead, Liverpool, Manchester and Salford. For various reasons these schemes all failed to meet with approval. In all except the Gateshead applications the local ratepayers were opposed to the idea, and without their approval, if need be at the expense of a poll, the matter had to be dropped. The Gateshead Bill was struck out by the Unopposed Bills Committee

not proceeded with. Generally the tests were felt to be a success, although the excessive weight was criticised (the motors alone accounted for 1½ tons), but in spite of this a speed of 15 m.p.h. was achieved.

Leeds and Bradford

For some reason which is not altogether clear, but probably because of uncertainty about which route to adopt and in part due to Board of Trade obstruction, Dundee Council was not the first in this country to run a trolleybus system, although it obtained general powers for that purpose as early as 1907. This honour fell jointly to Leeds and Bradford which obtained powers in 1910 and commenced operation on June 24, 1911. In passing, the first trolleybuses in the United States, petrol vehicle conversions operated by an estates company, began a service in the Los Angeles district towards the end of 1910.

During 1909 and 1910, following the publicity given to the demonstration at Hendon, something of a trolleybus mania set in, and powers were sought or plans drawn up for trackless trolley operation in many towns throughout the country of which Northampton, Malvern, Matlock, Croydon, Macclesfield, Newcastle upon Tyne and Falmouth are but a few examples.

(To be continued)

Marconi Marine announces that its New York depot has moved to new premises at 75 West Street, New York 6. The telephone number remains unchanged. From April 1 the company's Hull depot will have a new telephone number, Hull 26144.

Federated Paints, Limited, Dobbies Loan, Glasgow, C.4, has developed a new version of its aluminium etching primer. Named Strathclyde Etching Primer PA-10, it is a fully pigmented primer of which a single coat is claimed to give an adhesion of over 3,000 p.s.i. It is approved for use on aluminium by the Admiralty and was selected by Harland and Wolff as the priming coat for the aluminium superstructure of the new P. and O. liner *Canberra*.



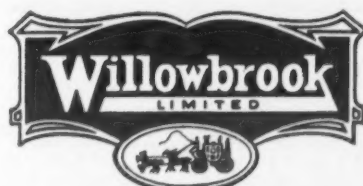
Quadrupling the Southern Region track at Folkestone. The excavation work in progress is for the preparatory cavity that will house part of the new station underneath the additional down line. The upper picture shows the roadbed of this line in course of preparation with the existing tracks to the right of the newly-built platform

new ideas from WILLOWBROOK



Illustration shows the new Willowbrook double decker bus recently supplied to the Potteries Motor Traction Co. Ltd.

What a wonderful achievement in transport engineering. Built on to a Leyland chassis, this bus has all the power and sturdiness to stand up to years of hard service. And it looks so elegant. There is absolute comfort in every one of the 73 seats. Wonderful passenger vision, both inside and out, because this bus is fitted with Philips fluorescent lighting. A translucent advertising panel on the offside upper saloon is illuminated from behind by concealed fluorescent tubes. What an outstanding advance in transport advertising!



A DUPLÉ GROUP COMPANY

WILLOWBROOK LIMITED

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Repair and Service also at Duplé Group Factories—Duplé Motor Bodies Ltd., The Hyde, Hendon, London, N.W.9. Tel.: COLindale 6412. Duplé Motor Bodies (Midland) Ltd., Swingbridge Road, Loughborough. Tel.: 4541.

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IMPORTANT CONTRACTS

Pine Sleepers for N.Z. Railways

A CCEPTANCE of tenders for the supply of 90,000 pinus radiata railway sleepers introduces the first major use of radiata pine sleepers by New Zealand Railways and marks an important step forward in the utilisation of the country's own resources. Difficulty has been experienced recently in obtaining supplies of imported hardwood sleepers of adequate durability at an acceptable price and the availability of New Zealand-grown pinus radiata sleepers therefore comes at an appropriate time to meet the railway's annual consumption of about 450,000 sleepers. Between 1948 and 1958 some 3,000 treated pinus radiata sleepers have been placed in the track for experimental purposes. Results of these trials, together with information on similar trials conducted in Australia, indicated that this type of timber, when suitably treated, gives good service except in sharply curved track or under exceptionally heavy traffic. New Zealand Forest Products, Limited, will supply 80,000 sleepers and the Valintine Sawmilling Co., Limited, 10,000.

Pegasus Computer for Cranfield

The College of Aeronautics, Cranfield, Beds, has placed an order with Ferranti, Limited, for a Pegasus digital computer; it will be used to teach students the fundamentals of programming and computer techniques, a study of which is already included in the college curriculum.

Manual Lifeboat Engine Starters

The use of vulnerable batteries and electrical wiring is avoided in lifeboats carried by the new Orient Line flagship *Oriana* by equipping the diesel engines of these craft with Simms inertia starters. Similar starting equipment is also specified for lifeboats of the new P. and O. liner *Canberra*.

Middlesbrough Vehicle Purchases

Middlesbrough Corporation has accepted tenders of Shelvoke and Drewry, Limited, for one refuse collector, Sherwood Brothers, Limited, for two waste-paper vehicles, Minorities Garage, Limited, for two tipping refuse collectors and one pick-up, and the Cleveland Car Co., Limited, for one Standard delivery van.

Boeing 720 Simulator for U.A.L.

An electronic flight simulator of the Boeing 720—latest American jet transport plane—has been

installed at the Denver flight training centre of United Air Lines. Manufactured by Link Aviation, Inc., the simulator reproduces the flight characteristics of the new 550-600-m.p.h. medium-range Boeing. United took delivery of the first of 18 720s last month.

Eastern Region Contracts

The Eastern Region of British Railways announces the following contracts:

Charles R. Price, Doncaster, for reconstruction of superstructure of Lowgates bridge at Staveley Central Station and reconstruction of engine inspection pits and engine asphalt at Retford Great Central locomotive depot.
R. H. Neal and Co., Limited, London, W.5, for three 3-ton mobile cranes.
The Auto-Mower Engineering Co., Limited, Bath, for two sets of end-on loading equipment to work with ballast cleaners.

Massey-Ferguson Records

In March, 1960, Massey-Ferguson exported nearly 7,000 tractors from the United Kingdom, more than at any previous time. In the previous four months, the company exported 18,000 units, which was substantially more than any other U.K. manufacturer, after a steady increase during the 1959 fiscal year, in which the company increased its exports of tractors to territories in the eastern hemisphere by 9 per cent compared with 1958.

Prefabricated Coach Garage

Burrett and Wells, Limited, Melksham, has bought a precast reinforced concrete building to house its coaches. A Marley Clear Span building basically similar to those used as industrial factories and agricultural buildings, it is 60 ft. long by 50 ft. span and 14 ft. high to the eaves. Clear Span buildings are erected by teams equipped with mobile cranes and site caravans operated by Marley Concrete, Limited, all over England and Wales.

B.I.C.C. Aircraft Cables in N.B. Locomotives

In the five 90-m.p.h. 2,000-h.p. diesel-hydraulic locomotives in the D600 class ordered from North British Locomotive Co., Limited, for the Western Region, Pren aircraft wiring cables manufactured by British Insulated Callender's Cables, Limited, are being used for electrical installation operating at 110 volts d.c. In all some 6,700 yd. of cable are used in each locomotive. Developed by B.I.C.C. in collaboration with the Royal Aircraft Establishment, Pren single- and multi-core cables

possess high-temperature and flame-retarding qualities and good insulation resistance to the solvent effects of fuel oils and hydraulic fluids.

Large Leyland Middle East Order

After receiving nearly £2 million worth of orders from the Middle East during 1959, the Leyland Motors group has just gained another order from this area for commercial vehicles valued at nearly £1 million. The present order comprises 168 Leyland Super Comet haulage lorries, 96 Leyland Super Comet tippers with Edbro tipping gear and 36 Albion Clydesdale bus chassis. Last month, Leyland received a contract from the Middle East for 750 diesel engines for conversion of American petrol-engined lorries.

New London Midland Contracts

The London Midland Region of British Railways announces the following contracts:

The Turriff Construction Corporation, Limited, Warwick, for reconstruction and widening of bridge at Coventry Warwick Road and station platforms and drainage in connection with reconstruction of Coventry Station, and for extension and reconstruction of platforms, earthworks, permanent way track section cabins and relay rooms on the Trent Valley Line between Stafford and Rugby.
Leonard Fairclough, Limited, Adlington, for reconstruction of bridges on Runcorn Branch and on Whitchurch-Tattenhall Line, and construction of new bridge on the Crewe-Birdswood Line in connection with the widening of Winsford-Middlewich Road (A54) for the Cheshire County Council.

North Eastern Region Contracts

Recent contracts placed by the North Eastern Region of British Railways include the following:

W. Fairburn, Limited, Hull, for installation of electric cabling and fittings at English Street goods depot, Hull.
Midgley and Sutcliffe, Limited, Leeds, for a vertical milling machine for York carriage works.
Cowans, Sheldon and Co., Limited, Carlisle, for a 20-ton electric traverser at the carriage and wagon works, Walkergate.
I.T.D., Limited, Birmingham, for a fork-lift truck for Walkergate.
Pierhead, Limited, Liverpool, for concrete deck units for short span bridges.
Lifting Gear Products (Eng.), Limited, Sheffield, for a travelling trolley for the chief civil engineer's department's Morris tracklayer.

New Western Region Contracts

The Western Region of British Railways, announces the following contracts:

John Morgan (Builders), Limited, Cardiff, for construction of a signalbox at East Usk and of relay houses near Newport.
A. E. Farr, Limited, Westbury, for earthworks and fencing in connection with the construction of a district engineer's depot at Bristol Ashton Gate.
The Reliance Telephone Co., Limited, Bristol, for an automatic telephone exchange at Marlard House, Cardiff.
The Fairfield Shipbuilding and Engineering Co., Limited, Chepstow, for supply of steelwork, etc., for the renewal of the cylinder bracings and diagonals to bridge near Newport Station.
Mountstuart Dry Docks, Limited, Cardiff, for annual overhaul and survey of ss *Great Western*.
Pelapone, Limited, London, W.1, for a standby generating set in Newport High Street Signalbox.

SHIPPING AND SHIPBUILDING

Cunard Restates its Case

CUNARD is still firmly convinced that two liners of about 75,000 tons gross, with a service speed of 30 knots, are the best and most profitable units with which to replace the *Queens*. These sentiments are contained in the statement by Sir John M. Brocklebank circulated in advance of the annual meeting on June 1. Sir John explains that he cannot say more at this stage, with the report of the Chandos Committee due to go shortly before the Minister of Transport. He says that so far as its dealings with Cunard are concerned, the committee has carried out its investigations with patience and in the most thorough manner.

Trade at Shoreham

MERCHANDISE passing through Shoreham Harbour during the last year established a record at 1,902,947 tons, 1,726 tons better than the previous year. Exports were down—18,419 tons against 31,104 tons the previous year—but practically all imports were up. Oil imports reached 243,535 tons against 229,845. General cargo was up from 17,969 tons to 31,428 tons.

For Pakistani Owners

FORMERLY in German ownership (she was built by Blohm and Voss at Hamburg in 1935), the Ministry of Transport troopship *Empire Fowey* (19,116 tons gross) has been sold to the Pan-Islamic Steamship Co., Limited, Karachi. She has been laid-up at Portland since March 9. She was re-engined and refitted in 1950 by Alexander Stephen and Sons, Limited, as a Government troopship and is now capable of 18½ knots.

Loading Calculator

THE increasing incidence of hull damage, suffered particularly by the larger vessels of today, due to the incorrect distribution of cargo, is giving rise to a worldwide demand for a robust but simple-to-operate calculator which can quickly and accurately work out hull stress for every condition of loading. To meet this demand, and with a view to anticipating legislation making loading calculators mandatory in certain classes of vessel, notably tankers, the Sperry Gyroscope Co., Limited, has obtained sole manufacturing and selling rights for an outstanding Norwegian invention which is being offered under the trade name Sperry-SINTEF loading calculator.

This is an electrical computer neatly presented for bulkhead mounting in a shallow cast alloy case. Operation of the calculator is self-evident from the layout of its faceplate, which contains an engraved ship's plan showing cargo compartments (each with its own tonnage setting knob) in conjunction with a selector switch, associated mean draught and shear stress setting knobs, and a balance meter to be used in "zeroing," with similar arrangements for obtaining trim and bending moment. Trim, bending moment, mean draught and maximum shear stress can be deduced in quick sequence by following a few simple instructions; in essence, these amount to setting on cargo tonnage values for each compartment, selecting the information required (starting with trim), adjusting the setting knob to obtain a zero reading on the balance meter and reading off the answer against the appropriate graduated dial.

Broadside Movement Units

MORE information is available about the transverse propulsion units which have already been fitted in *Oriana*, now fitting out at Barrow for completion in the autumn. Each unit comprises an electrically-driven impeller designed and constructed by Vickers-Armstrongs (Engineers), Limited, on the lines of the axial flow pump installation. The impeller is carried in a horizontal streamlined casing, with geared drive at right angles to the impeller shaft. The impeller casing with its drive is mounted in a cylindrical tube fitted athwartships at some distance below the light waterline. On each side of the section containing the unit, the tube continues as a cylindrical nozzle, terminating near the shell opening. A grating is fitted at the end of the tube to prevent entry of drift wood or large debris.

The principle of operation is similar to that of a jet, but since the optimum efficiency of such a system occurs when the speed of the propelled vessel is half that of the jet and in this case the ship's speed always can be considered as almost zero, then the thrust obtained is an optimum when the mass flow is a maximum with the corresponding lowest practicable velocity. This has been achieved in the case of the *Oriana* units by providing a tube and impeller of large diameter, running at comparatively slow speed, and therefore the installation has a higher efficiency than other types of device. The actual operation consists in drawing in water through the shell opening in one side of the ship and expelling it through the opposite opening. Direction is reversed by simply reversing the impeller motor. The installation in *Oriana* comprises a total of four separate units, two forward and two aft. Each unit is under separate remote control from each of three consoles on the navigating bridge, one in the centre and one in each wing, and by operating any combination of one to four units a degree of control not previously possible is achieved.

FINANCIAL RESULTS

NOTES on the trading results, dividends and financial provisions of companies associated with the transport industry are contained in this feature, together with details of share issues, acquisitions and company formations or reorganisations.

Beck and Pollitzer

Beck and Pollitzer, Limited, is paying 17 per cent (14 per cent) for 1959 with a final of 12 per cent. Group net profit is £170,436 (£169,155), after tax of £157,278 (£148,589).

Ransomes Sims and Jefferies

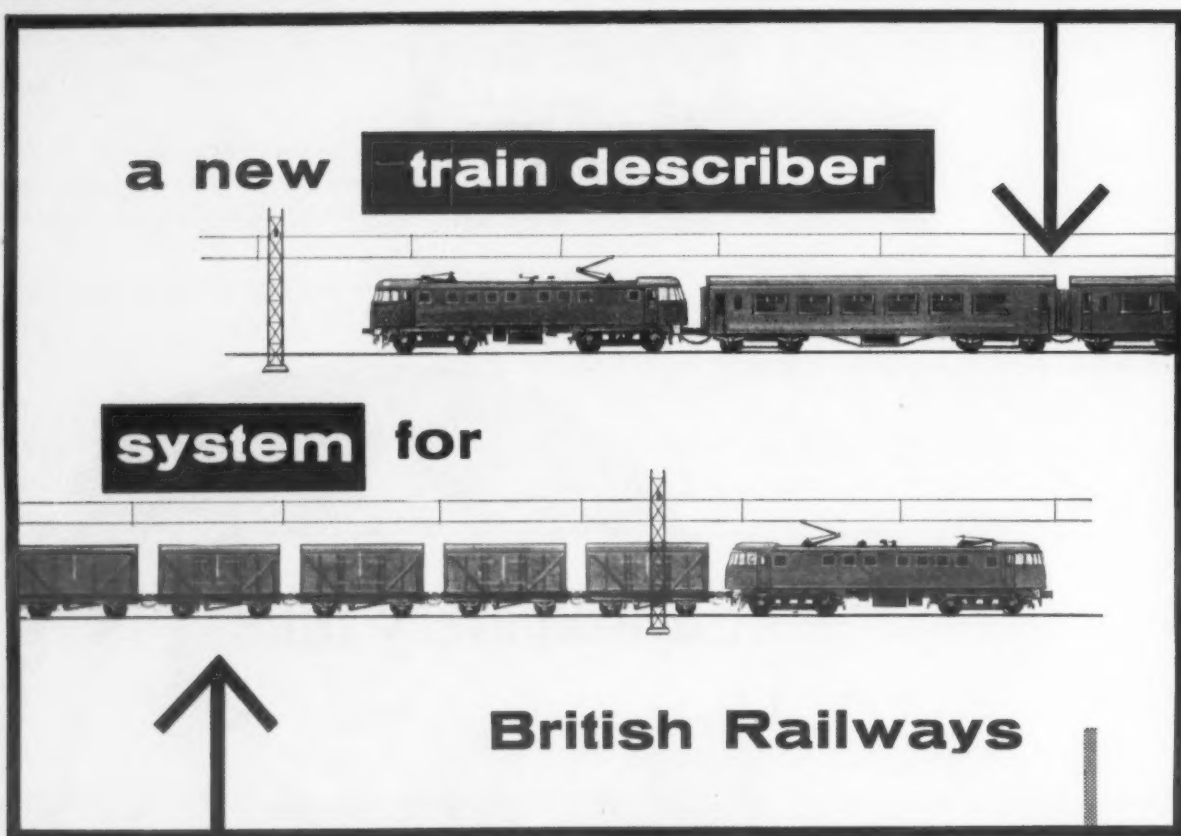
Ransomes Sims and Jefferies, Limited, had a group net profit in 1959 of £406,212 (£242,405) and dividend on capital increased by scrip and rights issues is 7½ per cent (6 per cent equivalent, including special interim).

Lisbon Electric Tramways

The board of Lisbon Electric Tramways, Limited, recommends payment of a final dividend of 4 per cent free of tax, making with the interim dividend of 2 per cent a total distribution of 6 per cent free of tax in respect of the year 1959.

Ashok Leyland

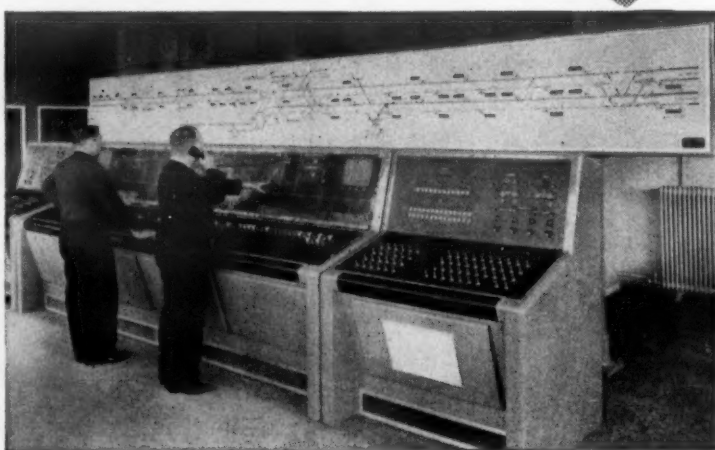
An increase in the authorised capital of the Leyland subsidiary company in India, Ashok Leyland, Limited, has been agreed at an extraordinary general meeting. The increase is from just over £2 million (Rs. 3.25 crores) to nearly £6½ million (Rs. 10 crores), by the creation of new ordinary shares of Rs. 5 each. The current programme is geared for an annual output of 3,000 Leyland Comet truck and bus chassis with single shift working and an output of 5,000 chassis per annum with double shift working. Additionally, 1,000 Leyland diesel engines of the 0.600 and 0.680 types are scheduled for production. The overall allowance for spare parts will also be stepped up considerably.



Designed and manufactured by STC as part of the electrification and resignalling of the British Railways London Midland region, this new Train Describer System has been installed to cover the busy route between Crewe and Manchester.

The outstanding feature of the system is the incorporation of the Train Describer into the track diagram thus providing an at-a-glance record of both the train description and train movements.

Descriptions are automatically transferred to successive Signal Berth Indicators in the track diagram by means of track circuits and when a signal box relinquishes control the description is automatically transmitted to the track diagram in the next box.

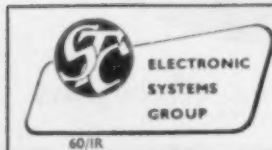


PRINCIPAL FEATURES OF THIS NEW

STC TRAIN DESCRIBER SYSTEM

- TRAIN DESCRIBER INCORPORATED INTO THE TRACK DIAGRAM.
- AUTOMATIC TRANSFER OF TRAIN DESCRIPTION

- AUTOMATIC CHECKING OF TRANSMISSION
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INSTRUMENTATION AND CONTROL DIVISION

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SOCIAL AND PERSONAL

Shipbuilding Advisory Committee

THE Shipbuilding Advisory Committee of the Ministry of Transport has now set up a sub-committee, whose terms of reference are "to review the prospects of, and the problems facing, the shipbuilding and shiprepairing industries and to make recommendations." It met first on May 5 and will report to the main committee. Sir James Dunnett, K.C.B., C.M.G., Permanent Secretary of the Ministry of Transport (who, as already announced, has taken the chair of the Shipbuilding Advisory Committee following the resignation of Sir Graham Cunningham) is also the chairman of the sub-committee. Its membership consists of the following:

Shipbuilding Conference: Col. T. Eustace Smith, C.B.E., T.D., Messrs. A. H. White, C.B.E., and R. B. Shepherd, C.B.E.; Shipbuilding Employers' Federation: Messrs. G. Harold R. Towers, R. W. Johnson and N. A. Sloan, B.L., Q.C.; Confederation of Shipbuilding and Engineering Unions: Messrs. E. J. Hill, G. H. Doughty, H. G. Barratt and A. Williams together with representatives of Government departments. The other bodies represented on the Shipbuilding Advisory Committee will be invited to send representatives when matters of direct concern to them are to be discussed.

As already recorded, Mr. H. M. Herbert has been made traffic manager in the new Northern division of the Scottish Region, B.R. Mr. Herbert entered the service of the L.N.E.R. at Ely as a clerk in 1933 and after service at a number of stations and in the office of the district goods and passenger manager at Cambridge was transferred to the chief general manager's office in 1938. He enlisted in the Royal Engineers (Transportation) in 1940 and was demobilised in 1946 with the rank of lieutenant-colonel. After a period of training as traffic apprentice in the L.N.E.R. Scottish area,



Mr. H. M. Herbert

he gained further experience in the offices of the operating superintendent, Edinburgh, the district commercial superintendent, Edinburgh, and the chief regional officer, York, before being appointed assistant to the district commercial superintendent (later manager), Edinburgh, in 1952. He became secretary to the Scottish Area Board of the B.T.C. upon its formation in 1955 and since 1958 had been assistant to the chief operating superintendent, Scottish Region.

We record with regret the death, at the age of 70, of Sir George Legh-Jones, a managing director of the Shell Transport and Trading Co., Limited. He began his career with the Royal Dutch-Shell Group in 1919, and had relinquished active duties with the group in 1951. He was closely associated with the development of the Shell tanker fleet.

The London Midland Region (London) Orchestral Society gave an attractive concert at the St. Pancras Town Hall on May 3. The orchestra was led by George Elmitt and conducted by John Grindley. The programme included works by Weber, Sibelius, Delibes and Wood, soloists being Owen Bryngwyn (bass), Norman Joyce (clarinet) and A. Foster (bassoon).

The service department of Simms Motor Units, Limited, has been reshaped and enlarged to allow for two new appointments, that of general service manager and export service manager. These positions are being held respectively by Mr. H. J. Stoneman, for many years service manager, and Mr. John Maund, until recently Simms' representative in Australia. Mr. D. Crawford becomes home service manager.

Mr. J. R. McBeath, appointed district goods manager, Glasgow, Scottish Region, B.R., entered the service of the former London and North



Mr. J. R. McBeath

Eastern Railway as a clerk at Twechar Station in 1935. Having served at a number of stations, he joined H.M. Forces during the 1939-45 war. He was appointed a traffic apprentice in 1947, and having completed a course of training took up a position in the commercial superintendent's department, Glasgow. In 1951 he became goods agent, Govan, and the following year he returned to the commercial superintendent's office, Glasgow, where he was successively clerk-in-charge of the branch lines section, chief development clerk, and deputy sales assistant. In 1956 Mr. McBeath was appointed assistant district traffic superintendent, Ayr, and in 1959 became district traffic superintendent there, the position which he has now vacated.

The P. and O. company announces the retirement of Mr. Adrian Hope, passenger manager since 1954, and the appointment of Mr. Richard Rolt as his successor.

Mr. K. W. C. Grand, a member of the British Transport Commission and formerly general manager, Western Region, British Railways, has been elected president of the Institute of Transport for 1960-61. A portrait and biography appear on page 13. He takes office on October 1 next.

At the annual general meeting of the Railway and Canal Historical Society, Mr. A. P. Voce was elected hon. secretary in succession to Mr. M. I. Berrill, who becomes hon. treasurer vice Mr. F. G. M. Watson. The annual dinner was held in Newport (Mon.); Mr. W. John Collett, borough librarian, Newport, proposed "The Society" to which the president, Mr. C. R. Clinker, replied in proposing "The Guests"; Mr. W. J. Morris, district traffic superintendent, Newport, Western Region, responded. Visits on May 7 and 8 to places of historic transport interest between Newport and Abergavenny were arranged by Mr. W. J. Skillern and Mr. Charles Hadfield.

Chief Civil Engineer of N.E. Region

IT is announced by the North Eastern Region of British Railways that Mr. E. L. Triffitt has been appointed chief civil engineer. Since 1955 he has been assistant civil engineer in this region.

At the annual general meeting of the Aluminium Development Association Mr. W. Brining, F.C.A., was elected president for the period 1960-61. He represents the Almin group of companies on the A.D.A. council.

Mr. E. F. Choppen has resigned from the board of the Esso Petroleum Co., Limited, following his appointment as deputy co-ordinator of the worldwide marketing operations of Standard Oil Company (New Jersey).

The British Transport Commission announces the following:

Mr. J. G. Dixon, to be senior solicitor assistant (first division).
Mr. W. S. P. Kersey, to be senior solicitor assistant (third division).
Mr. N. Seddon, instructor (electrical engineering), to be senior instructor (diesel traction), B.R. school of transport, Derby.

Mr. R. K. Cope, M.Sc., M.Inst.T., who has been appointed chairman of the management committee of Associated Motorways, is deputy traffic manager of the Birmingham and Midland Motor Omnibus Co., Limited. His new appointment took effect on April 1. Mr. Cope has been a member of the management committee since the formation of Associated Motorways in 1934, and was on the committee of the "Minor Pool" (Black and White, Greyhound, and Midland "Red") which started in 1932 and paved the way for the Associated Motorways pool. His service with Midland "Red" dates from 1923; he was appointed deputy traffic manager in 1944. He is convenor of No. 5 regional sub-committee on fares. Among outside interests, he is a director of the Talylln Railway in North Wales.



Mr. R. K. Cope

At the annual general meeting of the Royal Aeronautical Society on May 5 Mr. Peter G. Masefield, the president, presented a number of awards for 1959.

The George Taylor (of Australia) Gold Medal went to Mr. R. Hafner, F.R.Ae.S. (formerly chief designer (helicopters), Bristol Aircraft, Limited, now special director (Bristol), Westland Aircraft, Limited, for his paper "Safe Mechanisms."

The Edward Hush Memorial Prize went to Mr. E. C. Maskell, M.A., A.F.R.Ae.S., and to Dr. J. Weber, A.F.R.Ae.S. (aerodynamics department, Royal Aircraft Establishment) for their paper "The Aerodynamic Design of Slender Wings."

The Herbert Akroyd Stuart Memorial Prize went to Mr. P. Lloyd, C.B.E., M.A., F.R.Ae.S. (deputy director, National Gas Turbine Establishment) for his paper "Some Aspects of Engine Noise."

The Branch Prize went to Professor A. W. Morley, M.Sc., Ph.D., Whit. Sch. A.C.G.I., F.R.Ae.S. (formerly forward projects engineer, D. Napier and Son, Limited—now professor of applied mechanics, Royal Naval College, Greenwich) for his paper "Notes on Air Breathing Engines for Supersonic Flight."

Mr. Masefield's successor as president, Dr. E. S. Moulton, C.B.E., B.Sc.(Eng.), F.R.Ae.S., M.I.Mech.E., was inducted at the end of the meeting and will hold office until May, 1961.

What must be one of the longest periods of service in public transport came to an end on April 30 with the retirement of Mr. S. Pettican, local superintendent of the Silverhill (Hastings) depot of Maidstone and District Motor Services, Limited, with which company he has spent 30 of his 55 years in the industry. He started as an apprentice with the London General Omnibus Company at Cricklewood in 1905, about the time that London had its first regular petrol bus services.

Mr. A. G. Webster has been appointed district traffic superintendent, Ayr, Scottish Region, B.R. He joined the former Great North of Scotland



Mr. A. G. Webster

Railway as a clerk at Twechar Station in 1916. Having served at several stations he was transferred to the traffic superintendent's office, Aberdeen, in 1927, where he became an inspector and later a controller. In 1944 he was appointed head of the freight, plant and shipping section, district operating superintendent's office, Glasgow. In 1947 he became deputy chief staff clerk in the joint section of that office covering operating, commercial and motive power staff. From 1948 Mr. Webster was successively goods agent, Glasgow (High Street), goods agent, Greenock, and assistant goods agent, Glasgow (High Street and College). In 1952 he was appointed goods agent, Glasgow (Buchanan Street), the position he has vacated.

Mr. Arthur Whiteley, assistant managing director, Massey-Ferguson (Export), Limited, is retiring on June 10, on reaching his 60th birthday, on medical advice.

Short Brothers and Harland, Limited, announces the appointment of Mr. E. G. Collinson, B.Sc., A.F.R.Ae.S., as chief mechanical engineer to the aircraft division. He will be concerned with mechanical and system problems of aircraft, concentrating initially on the Britannic SC.5 freighter which Short Brothers is producing for R.A.F. Transport Command.

Mr. Gilbert Armstrong presided at the business sessions of the annual gathering of the managers' section of the Municipal Passenger Transport Association, held at Southampton, when a variety of subjects of current importance was discussed. Before the two-day session the managers were guests of the Clayton Dewandre Co., Limited; a visit to the Union Castle liner *Stirling Castle* was arranged by Shell-Mex and B.P., Limited, and there was also a luncheon at the Civic Centre, presided over by the Mayor of Southampton, Alderman Mrs. R. M. Stonehouse, J.P., who was thanked by the president, Mr. A. F. Neal.

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REPORTING RAILWAY PROGRESS

1



1 The Condor—Britain's finest freight express, diesel-hauled, about to leave London. Time: 7.32 p.m. Glasgow by 5.15 a.m. It's a daily routine—five times a week.



2 One item of its load: records which came off the production line in factory that afternoon.



3 Aboard the Condor go the loads, among them the box of music for Scotland's turntables.



4 Goods reach depot as packed, door-to-door in labelled container. They get personal service throughout.



5 Train manned: a crew of three—driver, mate, guard—will deliver the 54 container loads of goods by daybreak.

DELIVERING THE GOODS 400 MILES OVERNIGHT

LONDON—GLASGOW : GLASGOW—LONDON

All in a night's work—getting goods made yesterday into shops 400 miles away this morning. Not really magic... all done by Condor, newest of the railways' 850 daily freight expresses.



8 The one and only Condor stop: a pause at Carlisle in the small hours for a change of drivers: The goods are nearly on the counters.

6 Clean, streamlined cab. Button-control of 2,400 hp. One-time steam man, now part of the new diesel and electric railway age.

7 The bright streak in the night: the Condor hurls through sleeping Britain on its shuttlecock service. Top speed: 75 mph. Average over the 400 miles: 40 mph.

Equipped with vacuum brakes, as also are some 300,000 other freight wagons for speeded-up runs, part of British Railways £1,500 million Modernisation Plan.



9 The final phase: nine hours forty-three minutes later, Glasgow. Off the Condor swing the containers, on to the road vans. Delivery note checked.



10 Goods delivered on time.

Photographed by John Chillingworth

NEXT: THE CAR WENT TOO